THE PELVIS

The pelvis is the region of the trunk inferior to the abdomen.

The following parts of the pelvis will be described:

- The pelvic wall.
- The pelvic cavity.
- The perineum.

THE PELVIC WALL

The pelvic wall is formed of the following structures:

- Bones of the pelvis
- Ligaments
- Muscles
- Fascia
- Parietal peritoneum

The Bones of the Pelvis

It is formed of

1-The 2 hip bones: anteriorly & laterally 2-The

sacrum & coccyx posteriorly.

The pelvis is divided into 2 parts by the plane of the pelvic brim.

The **pelvic brim** is formed by:

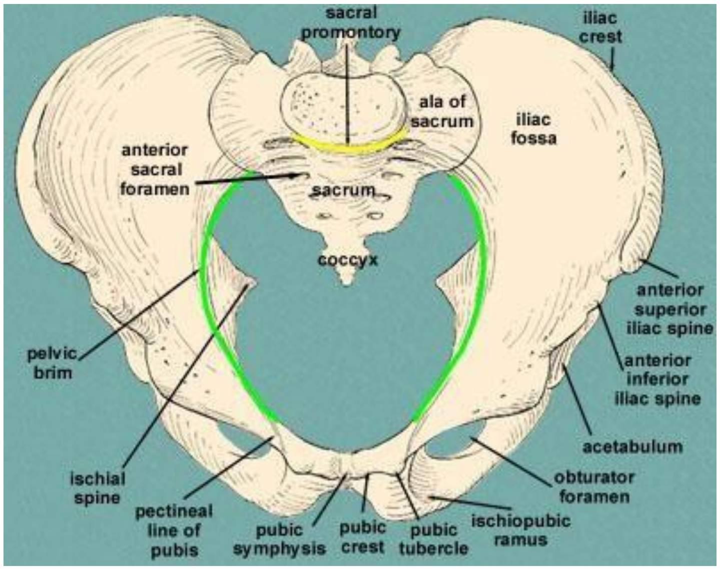
***Posteriorly**:*

sacral promontory.

Laterally: Arcuate line of ilium

Anteriorly*:*

symphysis pubis in front.



Parts of the pelvis:

False pelvis (Greater pelvis) above the pelvic brim.

True pelvis (Lesser pelvis) below the pelvic brim. The **False OR Greater Pelvis:**

It forms the lower part of the abdomen proper & is bounded by:

The iliac fossa (of hip bone) & iliacus muscle on each side,

The lumbar vertebrae behind &

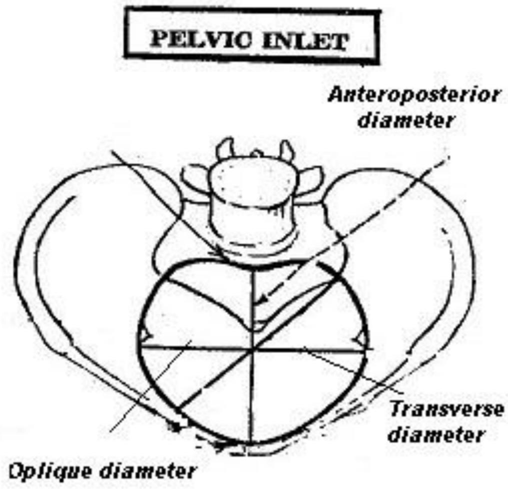
The lower part of the anterior abdominal wall in front.

The false pelvis supports the abdominal contents & after the 3rd month of pregnancy, it helps to support the gravid uterus.

The True OR Lesser Pelvis:

It has an inlet, an outlet & a pelvic cavity.

The Pelvic Inlet (Pelvic Brim)



Shape:

Triangular or heart shaped in males & Transversely oval in females.

Boundaries:

Posteriorly, by the sacral promontory.

Laterally, by the arcuate lines

Anteriorly, by the upper margin of the symphysis pubis.

Diameters of the inlet:

1- antero-posterior (conjugate) diameter (11 cm in female):

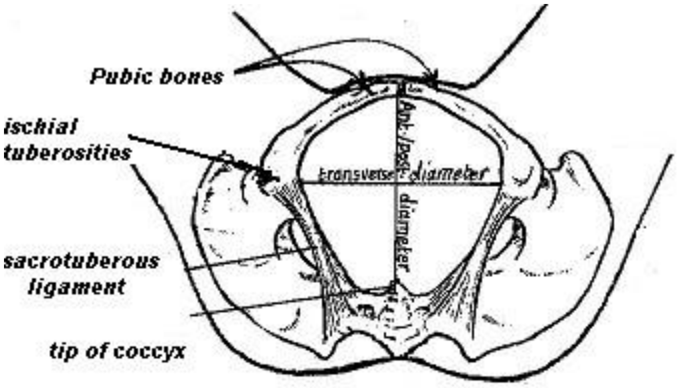
Extends from promontory of sacrum to the upper margin of symphysis pubis.

2-Transverse diameter (13 cm in female):

Extends between the farthest points of the arcuate lines.

3- Oblique diameter (12.5 cm in female) Extends from sacroiliac joint of one side to the iliopubic eminence of the opposite side.

The Pelvic Outlet.



Shape: It is diamond shaped.

Boundaries:

Posteriorly: the coccyx,

Laterally: the ischial tuberosities

Anteriorly: the pubic arch.

Diameters of the outlet:

1-antero-posterior(conjugate) diameter (12cm in female): Extends from the tip of coccyx to the lower border of symphysis pubis.

2-Transverse diameter (11 cm in female): Extends between the 2 ischial tuberosities.

The pelvic Cavity.

It lies between the inlet & outlet.

It is a short curved canal, with a short anterior wall & a long posterior wall.

The pelvic cavity is divided by means of the pelvic diaphragm into: -

Pelvis above the diaphragm &

Perineum below the diaphragm.

Position of the pelvis in the erect anatomical position:

The plane of the pelvic brim makes an angle of 60 degrees with the horizontal plane.

The anterior superior iliac spine & the upper border of symphysis pubis lie in the same vertical plane.

Diameters of the cavity: antero-posterior

(conjugate) diameter (13 cm)

Extends from midpoint of the back of symphysis pubis to the midpoint of the 3rd sacral piece

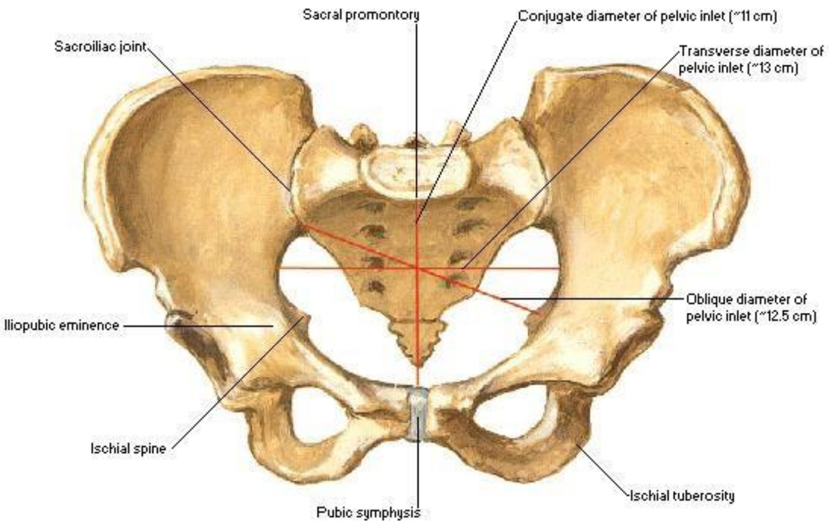
2-Transverse diameter (12.5 cm in female)

Is the widest transverse distance between 2 side walls of pelvis.

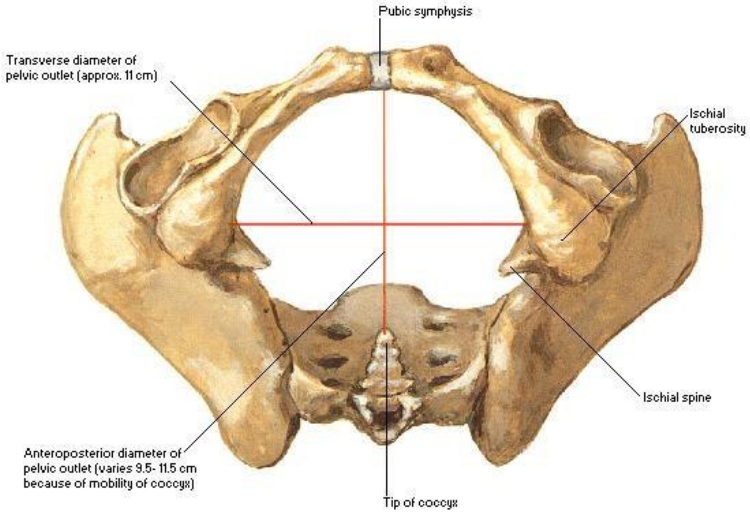
3- Oblique diameter (12 cm in female) Extends from the lowest point of sacroiliac joint of one side to the midpoint of the obturator foramen of the of the opposite side.

Differences of the Pelvis

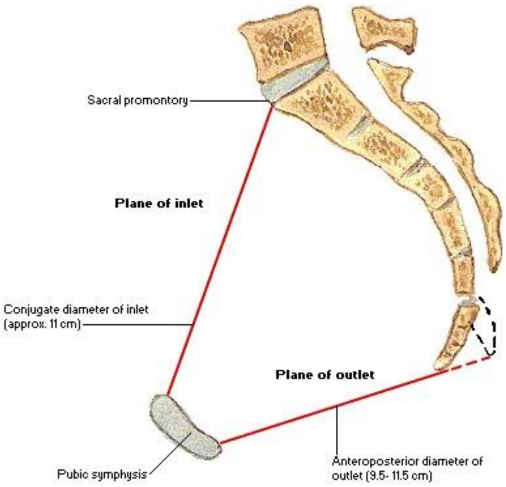
A


Sacral promontory
Conjugate diameter of pelvic inlet (~11 cm)
Sacroiliac joint
Transverse diameter of pelvic inlet (~13 cm)
Iliopubic eminence
Oblique diameter of pelvic inlet (~12.5 cm)
Ischial spine
Ischial tuberosity
Pubic symphysis

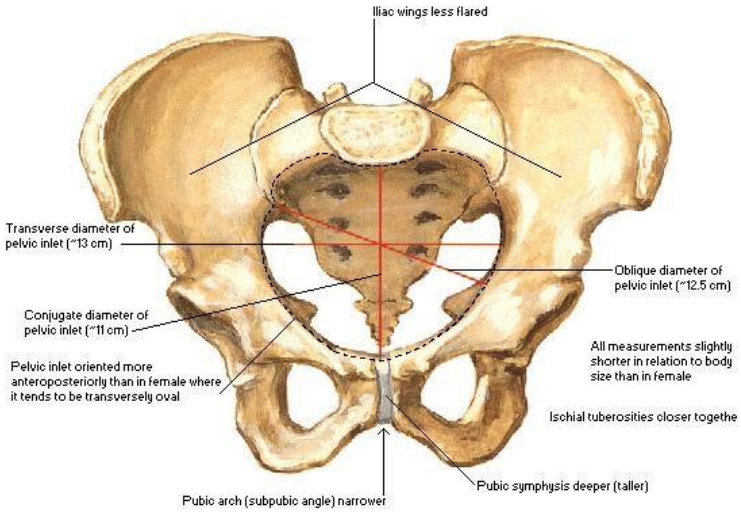
B


Pubic symphysis
Transverse diameter of pelvic outlet (approx. 11 cm)
Ischial tuberosity
Ischial spine
Anteroposterior diameter of pelvic outlet (varies 9.5- 11.5 cm because of mobility of coccyx)
Tip of coccyx

C


Sacral promontory
Plane of inlet
Conjugate diameter of inlet (approx. 11 cm)
Plane of outlet
Pubic symphysis
Anteroposterior diameter of outlet (9.5- 11.5 cm)

Female Pelvis (*A, B & C*)

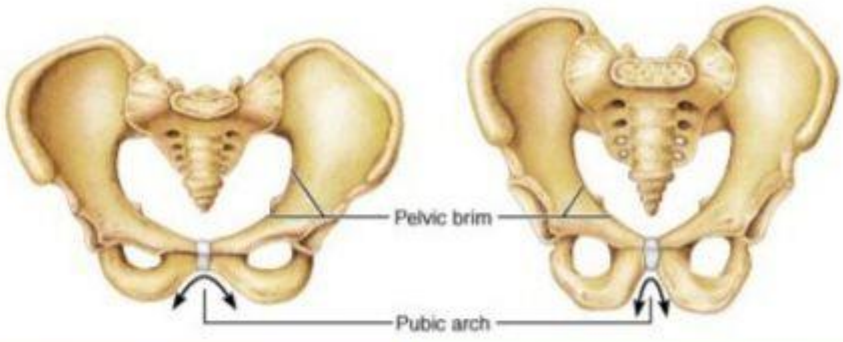

Iliac wings less flared
Transverse diameter of pelvic inlet (~13 cm)
Oblique diameter of pelvic inlet (~12.5 cm)
Conjugate diameter of pelvic inlet (~11 cm)
All measurements slightly shorter in relation to body size than in female
Pelvic inlet oriented more anteroposteriorly than in female where it tends to be transversely oval
Ischial tuberosities closer togethe
Pubic symphysis deeper (taller)
Pubic arch (subpubic angle) narrower

Male Pelvis

The bony pelvis shows sex differences, mainly to adapt the female pelvis for childbearing. The stronger muscles in the male are responsible for the thicker bones & the more prominent bony markings.

False pelvis is shallow in female & deep in male.

Pelvic inlet is transversely oval in female & heart shaped in male. Pelvic cavity is roomier in female & distance between inlet & outlet is much shorter. Pelvic outlet is larger in female. Sacrum is shorter, wider & flatter in female. The pubic arch is more rounded & wider in female.



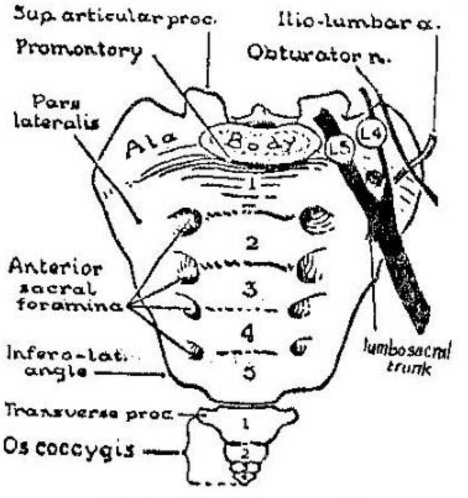
FEMALE	MALE
Bones are lighter, thinner	Bones heavier, thicker
False pelvis is shallow	False pelvis is deep
Pelvic cavity is wide & shallow	Pelvic cavity is narrow & deep
Pelvic inlet round/oval	Pelvic inlet heart-shaped + smaller
Pelvic outlet comparatively large	Pelvic outlet comparatively small
Subpubic angle large	Subpubic angle more acute
Coccyx more flexible, straighter	Coccyx less flexible, more curved
Ischial tuberosities more everted	Ischial tuberosities longer, face more medially

Sacrum: It is triangular bone formed of 5 sacral vertebrae which are fused together. It has base, apex, anterior surface, posterior surface & 2 lateral masses.

The base: is formed by 1st sacral vertebra. Its anterior border is called the sacral promontory. The lateral part of the base on each side is called ala of sacrum.

Apex: is directed downwards & articulates with the coccyx.

The anterior surface: is concave, smooth, formed by the fused bodies of the sacral vertebrae & shows 4 pairs of anterior sacral foraminae



Pelvic (anterior) aspect of sacrum

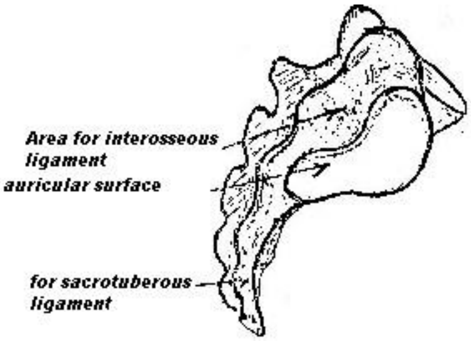
The posterior surface: is convex. It shows

Median sacral crest

4 pairs of dorsal sacral foraminae.

Sacral hiatus: at the lower end of sacral canal.

The lateral surface: triangular in shape & shows:



Rough area for attachment of interosseous sacroiliac ligament.

Auricular surface for articulation with the ilium.

Narrow lower part for attachment of sacrotuberous & sacrospinous ligaments.

Contents of sacral canal:

1- Cauda equina: the roots of sacral & coccygeal nerves.
2- The dura & arachnoid mater extending into the sacral canal as far as the 2nd sacral vertebra
3- The filum terminal: a prolongation of pia mater.
4-Lateral sacral arteries.
5-Loose areolar c.

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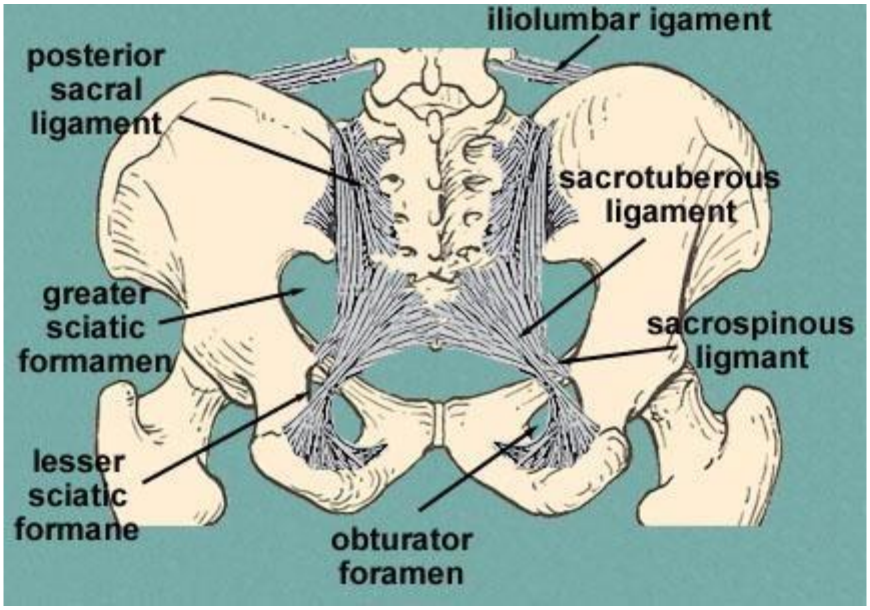
Ligaments of the pelvis:

Iliolumbar ligament:

It is a strong triangular ligament extending from the transverse process of L5 to the posterior part of inner lip of iliac crest**.**



Sacro-tuberous ligament:

It is a strong ligament which connects the sacrum with the hip bone. Upper medial attachment: to the posterior surfaces of the sacrum & coccyx and posterior iliac spines.

Lower lateral attachment: to the medial margin of the ischial tuberosity.

The ligament is wide at the attachments and narrow in the middle. The tendon of biceps femoris is partially continuous with the ligament.

Sacro-spinous ligament:

It is the fibrous dorsal part of the coccygeus muscle. It is triangular in shape. The apex is attached to the ischial spine and the base is attached to the last piece of sacrum and first piece of coccyx. It separates the greater and lesser sciatic foramina from each other.

Greater sciatic foramen:

It is bounded by the greater sciatic notch of the hip bone, and sacrotuberous & sacro-spinous ligaments.

The following structures pass through the foramen:

1) The piriformis muscle
2) Structures above the piriformis:

- Superior gluteal nerve Superior gluteal vessels 3) Structures below the piriformis:
- Inferior gluteal nerve.
- inferior gluteal vessels
- Sciatic nerve
- Pudendal nerve
- Internal pudendal vessels
- Posterior cutaneous nerve of the thigh.
- Nerve to obturator internus.
- Nerve to quadratus femoris.

Lesser Sciatic Foramen It is bounded by the lesser sciatic notch and sacro-tuberous & sacro-spinous ligaments.

The following structures pass through the foramen:

- Tendon of obturator internus muscle.
- Nerve to obturator internus muscle.
- Pudendal nerve.
- Internal pudendal vessels.

The pudendal nerve and internal pudendal vessels pass from the greater to the lesser sciatic foramina.

The obturator membrane:

It closes the obturator foramen completely except at its upper part where the obturator canal is formed. The obturator nerve and vessels leave the pelvis through the obturator canal to reach the thigh.

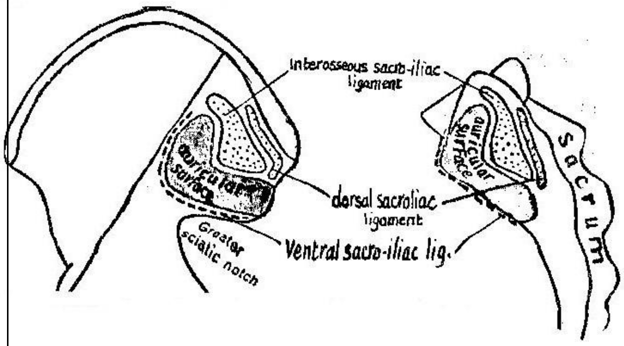
JOINTS OF THE PELVIS:

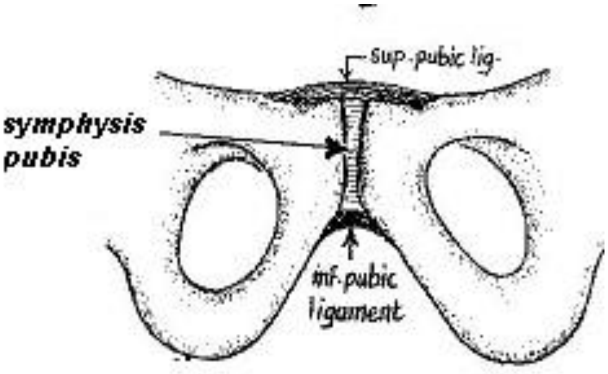
Lumbo-sacral joints:

It is similar to the joints between the lumbar vertebrae. The lumbo-sacral inter-vertebral disc is more wedge shaped than the other discs. This makes more angle between the lumbar vertebrae and the sacrum.

***Sacroiliac joint*:** The sacroiliac joint is a plane synovial joint. It is very strong joint with little movement. It is responsible for the transmission of the body weight from the vertebral column to the hip bones.

- The articular surfaces are auricular surfaces of the sacrum and ilium. It is supported by the following ligaments: Ventral sacro-iliac ligament.
- Dorsal sacro-iliac ligament.
- Interosseous sacro-iliac ligaments which are very strong joining the wide rough areas near the articular surfaces dorsally.





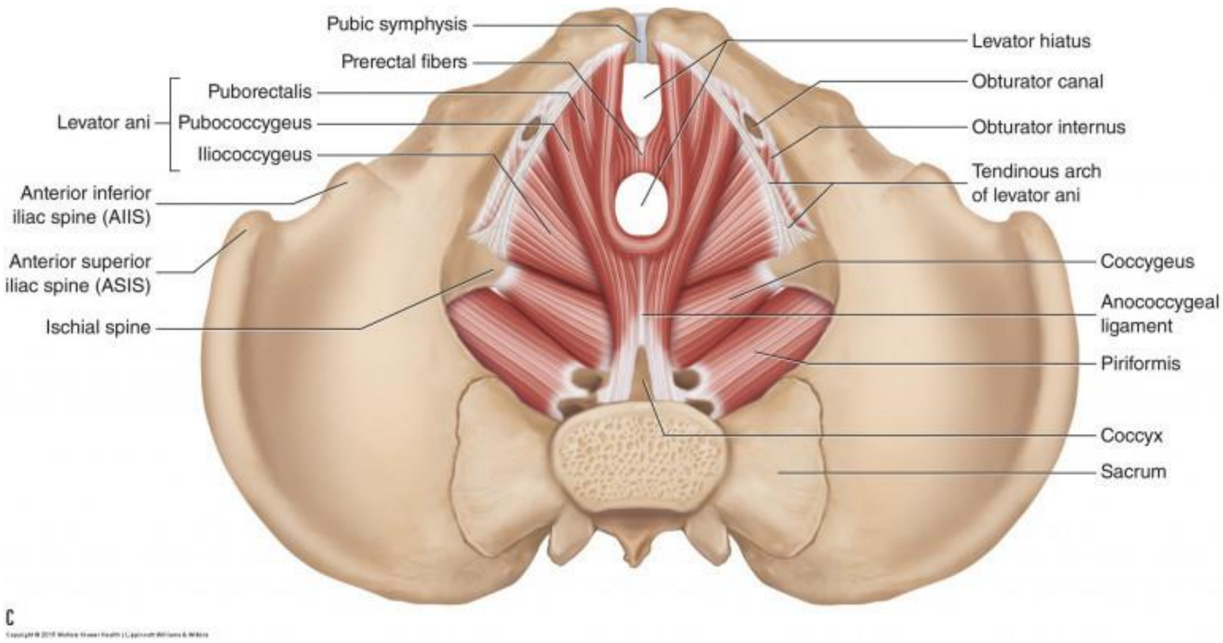
Symphysis pubis:

Is a secondary Cartilaginous joint between the medial surfaces of pubic bones. It shows no movements. It is supported by anterior, posterior, inferior and superior ligaments which are thickening of the fibrous capsule of the joint.

Sacro-coccygeal joint:

It is a secondary cartilaginous joint formed of inter-vertebral disc like other inter-vertebral joints. It shows some movement.

Muscles of the pelvis



PIRIFORMIS

Origin:

Pelvic(anterior) surface of middle 3 pieces of sacrum.

Insertion: The muscle passes through the greater sciatic foramen to be inserted into the upper border of the greater trochanter.

Nerve supply: S1, 2 nerves.

OBTURATOR INTERNUS

Origin:

1. Pelvic (inner) surface of obturator membrane.
2. Margins of obturator foramen.
3. Wide area above & behind obturator foramen.

Insertion: The tendon passes through the lesser sciatic foramen to be inserted into medial surface of the greater trochanter

Nerve Supply: Nerve to obturator internus

Obturator fascia: It is a dense layer of fascia covering the pelvic surface of obturator internus muscle. It fuses with the periosteum of the hip bone at the margins of the muscle. The obturator fascia is thick between the ischial spine and the body of the pubis forming the **tendinous arch** which gives origin to the levator ani muscle. Inferior to the tendinous arch the obturator fascia forms the lateral wall of the ischio-rectal fossa and splits to form the pudendal canal medial to the ischial tuberosity.

The pelvic floor (inferior pelvic wall):

It is also called the pelvic diaphragm because it separates the pelvic cavity above from the perineum below. It supports the pelvic viscera which lies above it. The pelvic diaphragm is formed of:

- Levator ani muscles.
- coccygeus muscles.
- The fascia covering these muscles.

The anterior part of the pelvic floor is incomplete as it allows the passage of the urethra in male and urethra & vagina in female.

The levator ani muscle

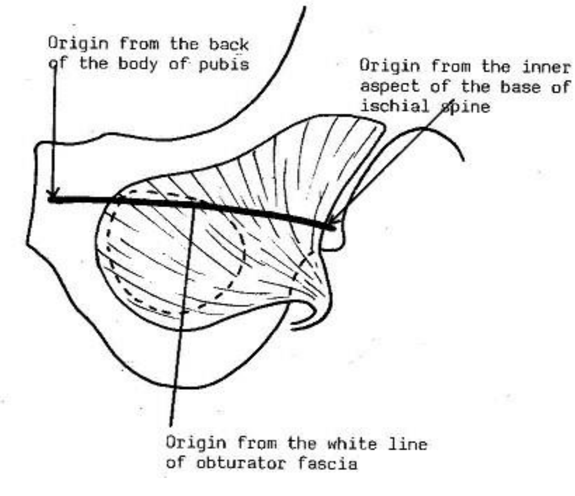
It is a wide sheet of muscle which forms the floor of the pelvic cavity separating it from the perineum.

Origin: It has a wide origin from:

1-Pelvic (posterior) surface of the body of the pubis.

3-2-Tendinous arch of obturator fascia.

Ischial spine

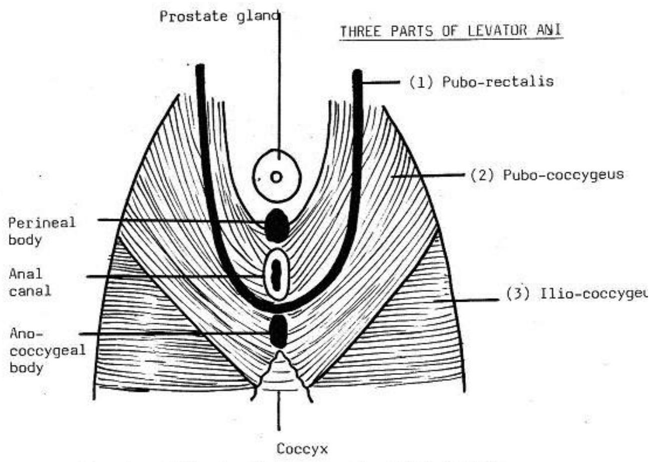

Origin from the back of the body of pubis
Origin from the inner aspect of the base of ischial spine
Origin from the white line of obturator fascia

Insertion: The muscle converges from the wide origin to the insertion. Three parts could be identified:

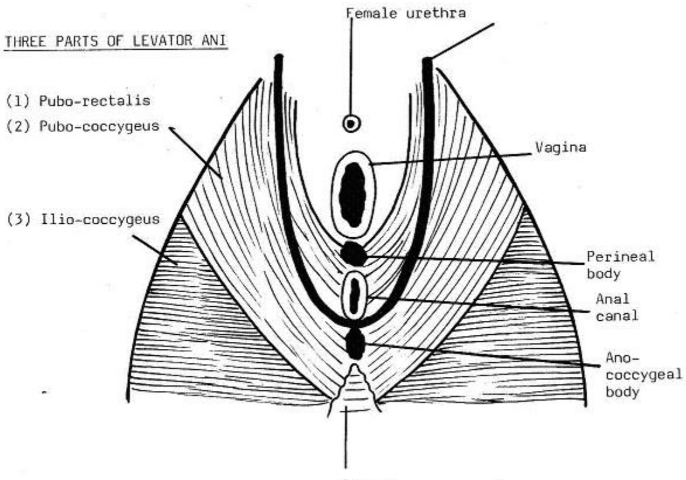
1. The anterior fibres pass nearly horizontally backwards below the prostate and urinary bladder in male and is called *levator prostate*. In female, they pass beside the vagina and is called

pubo-vaginalis or *sphincter vaginae.* The fibres are inserted into the perineal body.

2. The posterior fibres pass infero-medially to form the *pubococcygeus* and *ilio-coccygeus.* The fibres will be inserted into the sides of the coccyx and skin of the perineum.
3. Part of the muscle which arises from the pubic bone forms a separate bundle. It passes downward and backward and medially to meet the opposite muscle at the ano-rectal junction. Muscles of the both sides together form a U-shaped sling called the *pubo-rectalis muscle*



Superior view of the two levatores ani muscles in male



Superior view of the two levatores ani muscles in female

Nerve supply:

- Inferior (perineal surface) receive fibres from the inferior rectal nerve and perineal branch of pudendal nerve
- Superior (pelvic) surface receive fibres from the lower sacral and coccygeal nerves
- ***Action:***
  1. The muscle supports the pelvic viscera in position.

2. It supports the posterior wall of vagina and forms incomplete sphincter to the vagina (*sphincter vaginae*) with the help of the bulbo-spongiosus muscle. In male it supports the prostate (*levator prostate*).
3. Elevation of the pelvic diaphragm. This together with contraction of the muscles of the abdominal wall causes increase in the intra-abdominal pressure. This action helps in forced expiration, vomiting, defecation, and labor.
4. The elevation of the wall of the anal canal against the descending mass of faeces help in the process of defecation (*pubococcygeus* & *Ilio-coccygeus)*.
5. The *pubo-rectalis* muscles has a separate action. It increases the flexure of the ano-rectal junction preventing the passage of faeces (opposite action to other parts).

The coccygeus muscle:

The anterior part of the sacro-spinous ligament is muscular and called the coccygeus muscle. The muscle is triangular in shape.

Origin: The apex is attached to the ischial spine.

Insertion: The lateral margin of last piece of sacrum and first piece of coccyx.

Nerve supply: Lower sacral nerves (S4).

Action:

Supports the pelvic viscera.

May make little forward movement of the coccyx.

APPLIED ANATOMY

The Perineal Body:

- Also known as the central tendon (ligament) of the perineum, is an important structure, especially in females during child bearing.

- Tear of this body as in delivery → removes support from the posterior wall of the vagina → leading to prolapse of vaginal wall through the vaginal orifice.

- So during labor, it is preferable to do an ***episiotomy***, to enlarge the vaginal orifice & prevent the occurrence of a jagged perineal tear.

- This episiotomy is a clean surgical incision, which passes through the skin, the vaginal wall, & bulbospongiosus muscle; but should not reach the anus.

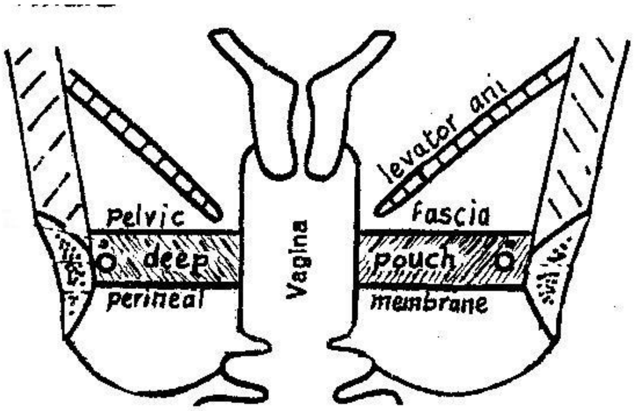
A clean surgical incision is better than a jagged perineal tear.

- Also weakening of the pelvic diaphragm as after delivery leads to stress incontinence, which means dribbling of urine (involuntary) with increased intra-abdominal pressure as in coughing, sneezing, or weight lifting.

The pelvic fascia: Is the connective tissue covering of the contents of the pelvis.

1) Visceral pelvic fascia is covering the organs of the pelvis (e.g. urinary bladder, rectum, vagina, etc..). It is formed of loose connective tissue, and covered by peritoneum in most cases.
2) The parietal pelvic fascia is the fascia covering the pelvic wall. It is continuous with the fascia iliaca laterally and fascia transversalis anteriorly. The following parts can be identified:
    a) Fascia of piriformis which is covering the piriformis muscle.
    b) Obturator fascia covering the obturator internus muscle.
    c) Fascia of the pelvic diaphragm covering the levator ani muscles and coccygeus.
    d) Two layers of this fascia are found:

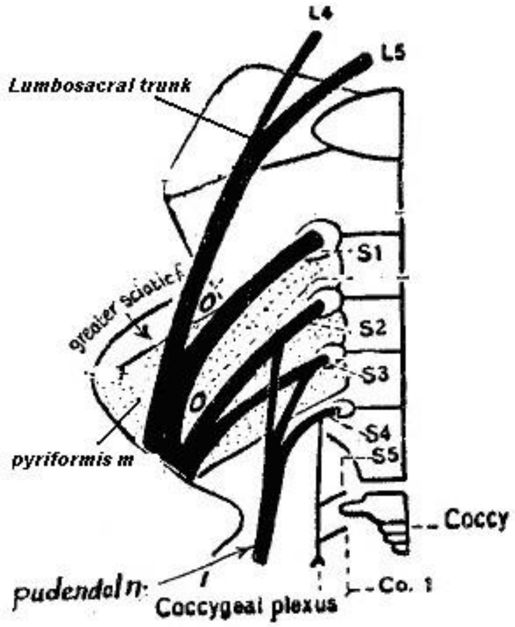
- Superior fascia of the pelvic diaphragm which covers the superior surface of the levator ani muscle. It is continuous with the visceral pelvic fascia. It is thickened to form the pubo-prostatic ligament in male and pubo-vesical ligament in female.

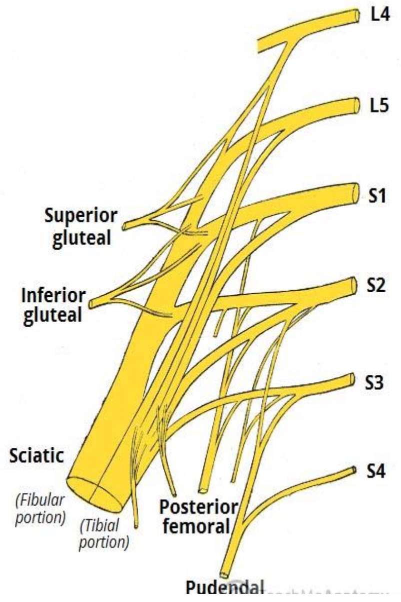


- Inferior fascia of the pelvic diaphragm which covers the inferior surface of the levator ani muscle. It forms the medial wall of the ischio-rectal fossa.

NERVES OF THE PELVIC WALL:

Sacral plexus: It is formed of the following nerves:





- The lumbo-sacral trunk.
- Ventral rami of sacral nerves number 1,2 & 3.
- Part of the ventral ramus of sacral nerve number 4.

Lumbo-sacral trunk:

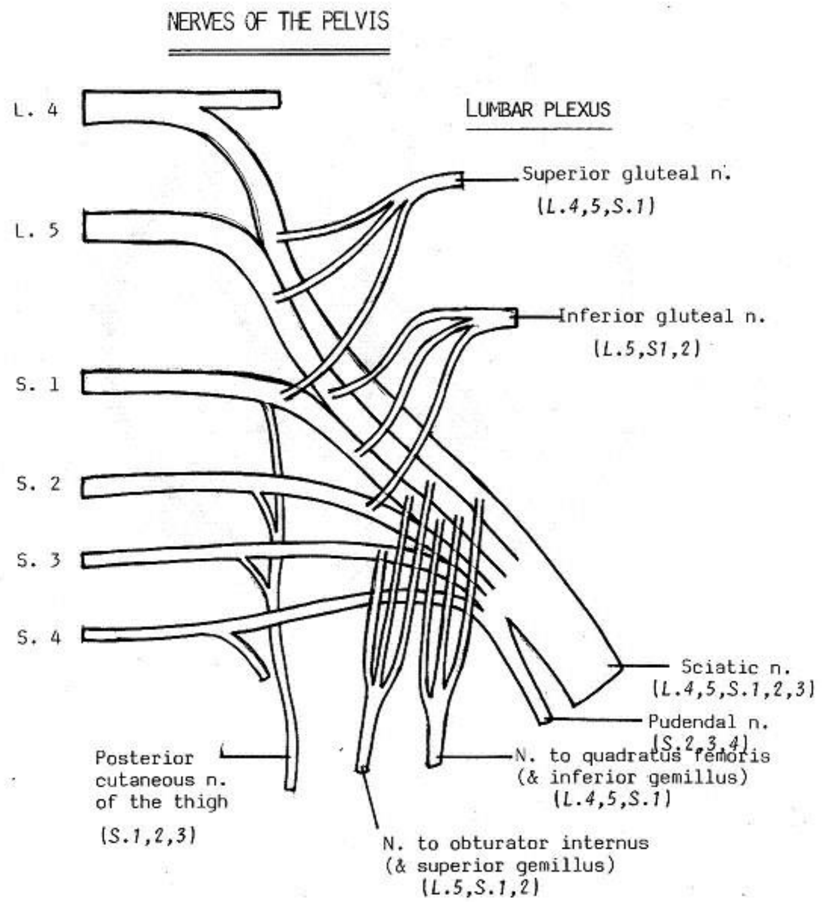
This is a thick cord formed of the whole ventral ramus of the fifth lumbar nerve and the lower part of the fourth lumbar nerve. It descends obliquely on the ala of sacrum to the pelvis. It joins the sacral ventral rami in front of the piriformis muscle.

Ventral rami of the sacral and coccygeal nerves:

The upper four sacral nerves come out through the pelvic sacral foramina. The fifth sacral and coccygeal nerves come out through the sacral hiatus and reach the pelvis by piercing the sacro-spinous ligament and coccygeus muscle.

The sacral plexus is formed on the pelvic surface of the piriformis muscle.

Branches of the sacral plexus:



1) Branches to the lower limb: These branches leave the pelvis through the greater sciatic notch. They are:

- Sciatic nerve (L4,5 & S1,2,3): It is the largest branch of the plexus. It leaves the pelvis through the greater sciatic foramen below the piriformis.
- Superior gluteal nerve (L4,5 & S1): It leaves the pelvis with the superior gluteal vessels through the greater sciatic foramen above the piriformis to reach the gluteal region. It supplies the gluteus medius, gluteus minimus, and tensor fascia lata muscles.
- Inferior gluteal nerve (L5 & S1,2): It leaves the pelvis through the greater sciatic foramen below the piriformis to reach the gluteal region. It supplies the gluteus Maximus muscle.
- Nerve to quadratus femoris (L5, & S,1,2): It leaves the pelvis through the greater sciatic foramen below the piriformis to reach the gluteal region. It supplies the quadratus femoris & inferior gemellus muscles.
- Nerve to obturator internus (L4,5 & S1): It leaves the pelvis through the greater sciatic foramen below the piriformis to reach the gluteal region. It crosses over the base of the ischial spine to pass through the lesser sciatic foramen. It reaches the ischiorectal fossa along with the pudendal nerve. It supplies the obturator internus and superior gemellus muscles.
- Posterior cutaneous nerve of the thigh (S1,2,3): It leaves the pelvis through the greater sciatic foramen below the piriformis to reach the gluteal region. It is a cutaneous nerve supplying the skin of parts of the buttock and back of the thigh.

2) Branches to the pelvis and perineum:

Nerve to Piriformis (S1,2)

Nerves to levator ani and coccygeus (S4).

Pudendal nerve (S2,3,4): It leaves the pelvis through the greater sciatic foramen below the piriformis to reach the gluteal region. It crosses over the sacro-spinous ligament to pass through the lesser sciatic foramen. It reaches the perineum and pass in ischio-rectal fossa with the nerve to obturator internus.

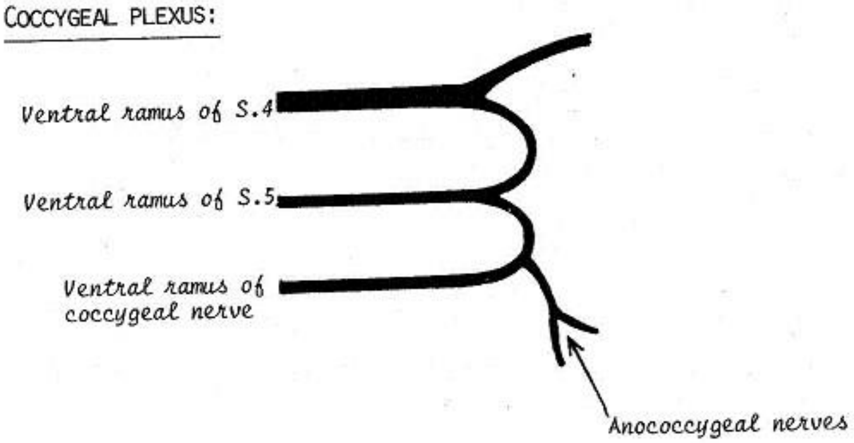
Perineal branches (S4): They supply the external anal sphincter and the skin posterior to the anus.

3) Branches to the gluteal region:

The perforating cutaneous nerve (S2,3): It pierces the sacrotuberous ligament and gluteus Maximus muscles to reach the skin of the gluteal region.

Coccygeal plexus

It is a small plexus which lies on the pelvic surface of coccygeus. It supplies it and part of levator ani. It pierces the coccygeus and sacro-tuberous ligament. It supplies the skin on the dorsum of the coccyx and between it and the anus.



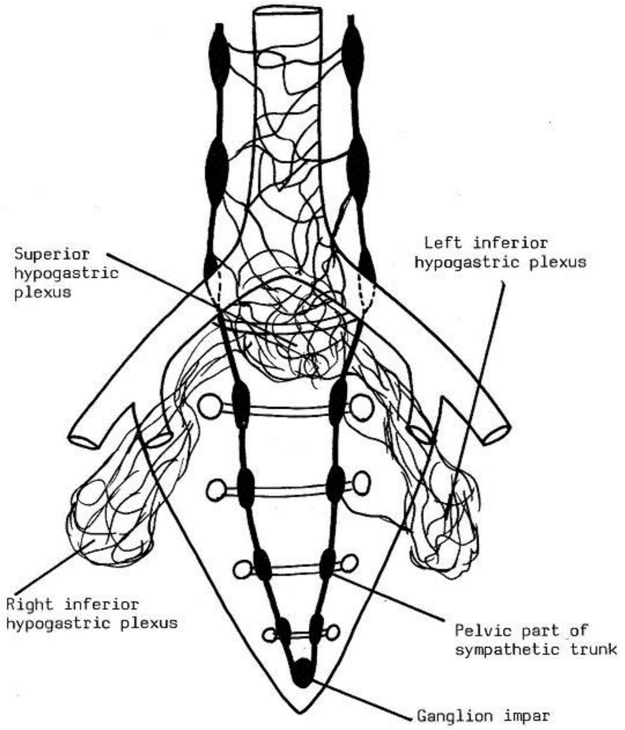
Autonomic nerves of the pelvis:

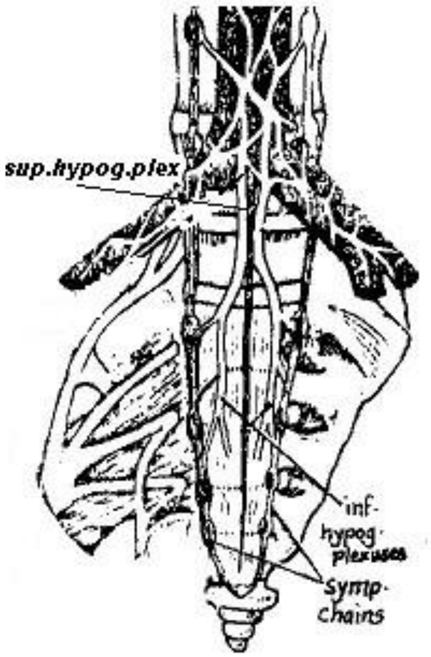
The autonomic nerves include the sympathetic and parasympathetic nerves. The autonomic plexuses contain both sympathetic and parasympathetic fibres.

Pelvic part of the sympathetic trunk:

It descends into the pelvis over the medial part of the ala of the sacrum. It passes in front of the sacrum medial to the margins of the sacral foramina. Sympathetic trunks of both sides join together on the coccyx forming the *ganglion impar*. During its course it is covered by pelvic fascia and pelvic peritoneum then the third part of the rectum. It shows 4 ganglia and the ganglion impar. It gives the following branches:

- Grey rami communicans to all sacral and coccygeal ventral rami.
- Small filaments around the median sacral artery.
- Branches to inferior hypogastric plexus.
- branches to the rectum.


Superior hypogastric plexus
Left inferior hypogastric plexus
Right inferior hypogastric plexus
Pelvic part of sympathetic trunk
Ganglion impar



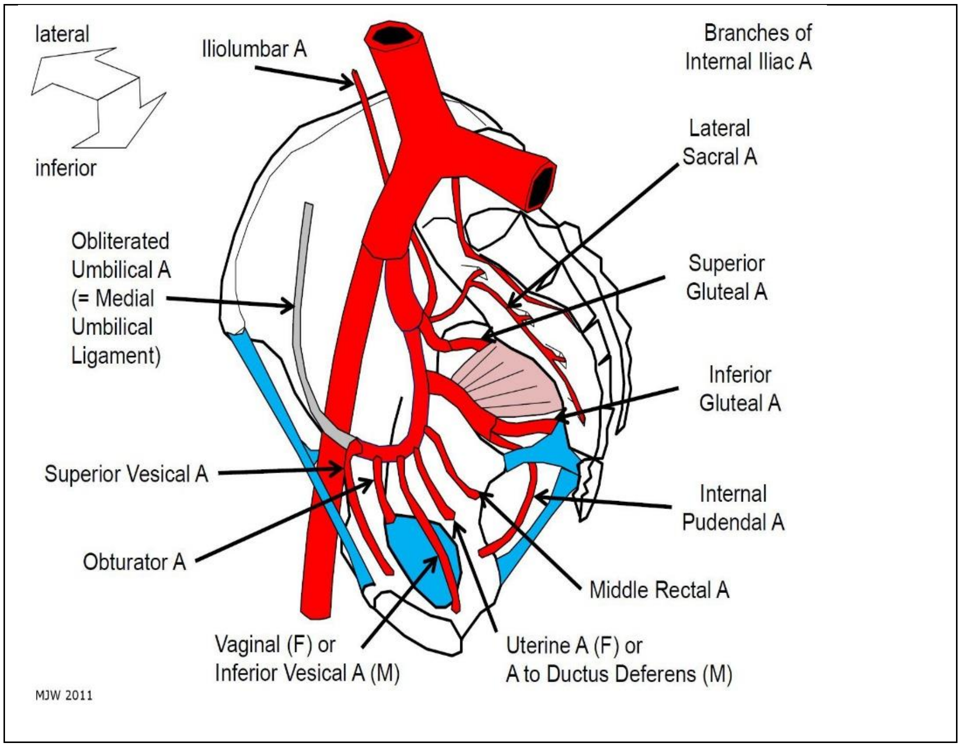
Pelvic parasympathetic nerves:

These are branches of the sacral nerves which join the pelvic autonomic ganglia.

The pelvic hypogastric plexuses:

The superior hypogastric plexus descends into the pelvis and divide into two inferior hypogastric (pelvic) plexuses. Each one surrounds the corresponding internal iliac artery. The hypogastric plexuses receive sympathetic fibres from the aortic plexus and parasympathetic from the sacral nerves. They give branches to other smaller plexuses which supply the pelvic organs.

BLOOD VESSELS OF THE PELVIC WALL:


lateral
inferior
Iliolumbar A
Branches of Internal Iliac A
Lateral Sacral A
Obliterated Umbilical A (= Medial Umbilical Ligament)
Superior Gluteal A
Inferior Gluteal A
Superior Vesical A
Internal Pudendal A
Obturator A
Middle Rectal A
Vaginal (F) or Inferior Vesical A (M)
Uterine A (F) or A to Ductus Deferens (M)
MJW 2011

Arteries of the pelvic wall:

Internal iliac artery:

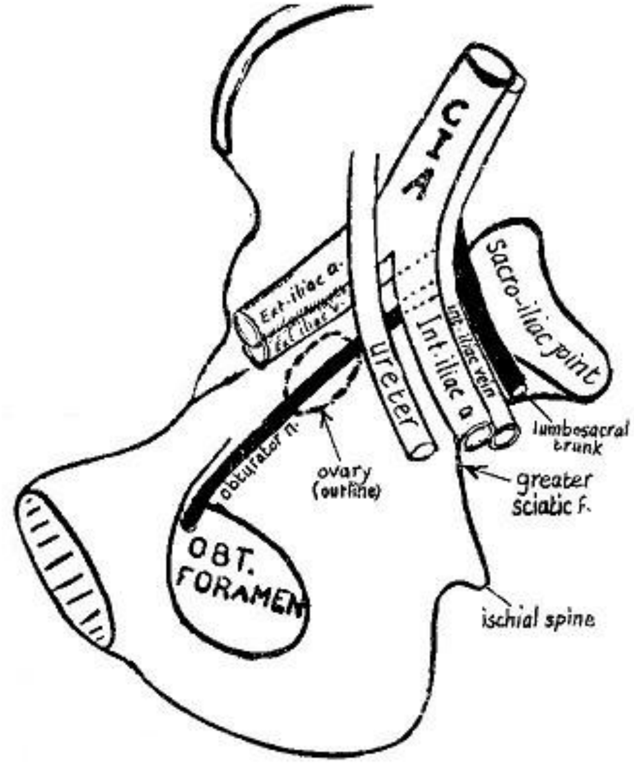
It begins in front of the sacroiliac joint as one of the two terminal branches of the common iliac artery. It passes backward and downward in the pelvis to end near the upper margin of the grater sciatic foramen by dividing into the anterior and posterior divisions.

Relations of internal iliac artery:

Laterally: Psoas major, external iliac vein and obturator nerve. Medially: The pelvic peritoneum, coils of ilium on the right and the pelvic colon on the left.

Posteriorly and above: Sacroiliac joint, lumbo-sacral trunk, and internal iliac vein.

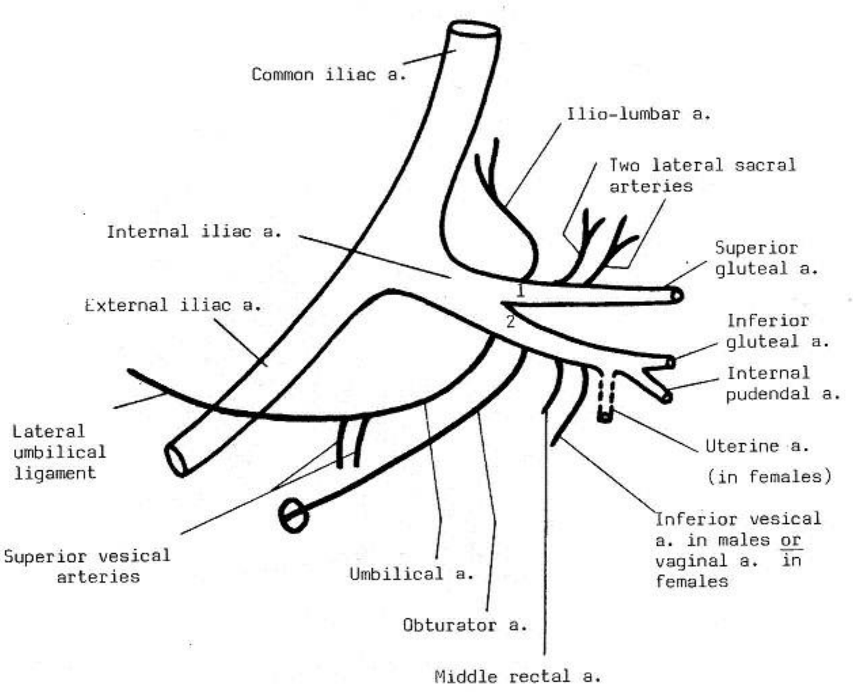
Anterior and below: The ureter.



Branches

A) Posterior division:

1-Superior gluteal artery Which is the direct continuation of the internal iliac artery. It passes between the lumbo-sacral trunk and first sacral nerve. It leaves the pelvis through the greater sciatic notch above the piriformis along with the superior gluteal nerve



1= Posterior division of the internal iliac artery.
2= Anterior division of the internal iliac artery.

2-Iliolumbar artery: It ascends deep to the psoas major and divides into two branches, the *iliac* and *lumbar*. The iliac branch passes laterally on the iliacus muscle. The lumbar branch ascends posterior to the psoas major muscle

3-Lateral sacral arteries: They are two in each side which pass medially and each divide into two branches making total of four on each side. They pass through the pelvic sacral foramina to supply the contents of the sacral canal. They come out through the posterior sacral foramina to supply the muscles and skin of the back of the sacrum.

B) Anterior division: giving two types of branches;

1-Umbilical artery: It passes antero-inferioly on the lateral wall of the pelvis, on the sides of the urinary bladder. It gives two or three *superior vesical branches* which supply the urinary bladder. after that the artery is obliterated and forms the lateral umbilical ligament which ascends behind the anterior abdominal wall to the umbilicus.

2-Obturator artery: It passes with the obturator nerve through the obturator canal to reach the thigh in the lower limb. It passes between the nerve above and vein below. It gives the *pubic branch* which passes on the pelvic surface of the pubis, *muscular branches* and *acetabular branch*.

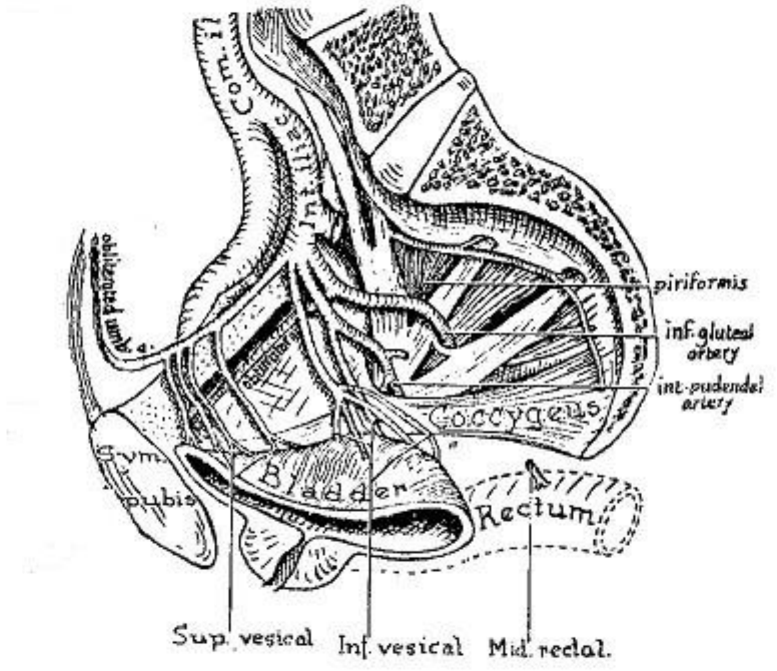
3-Inferior vesical artery (in male only) It runs forwards to the base of the urinary bladder to supply the seminal vesicles, prostate and postero-inferior part of the urinary bladder and vas deferens. 4-Vaginal artery (in female only). It corresponds to the inferior vesical artery in male. It passes forward to supply the vagina, postero-inferior part of the urinary bladder and pelvic part of the urethra.

5-Uterine artery (in female only). It may arise from the vaginal, umbilical or medial rectal arteries. It passes along the root of the broad ligament. It crosses medially above the ureter on the side of the lateral fornix of vagina. It runs tortuously along the lateral margin of the uterus between the layers of the broad ligament. It supplies the superior part of vagina, the uterus, and part of the uterine tube. It anastomoses with the corresponding ovarian artery.
in the broad ligament.

6-Middle rectal artery: It passes medially to supply the rectum and vagina or seminal vesicle.

7-Internal pudendal artery: It descends if front of the piriformis and the nerves of the sacral plexuses. It leaves the pelvis through the greater sciatic notch below the piriformis. It crosses the ischial spine and passes through the lesser sciatic foramen to the perineum.

8-The inferior gluteal artery: It passes between the ventral rami of the first and second sacral nerves. It leaves the pelvis through the greater sciatic notch below the piriformis. It gives no branches in the pelvis.



Median sacral artery:

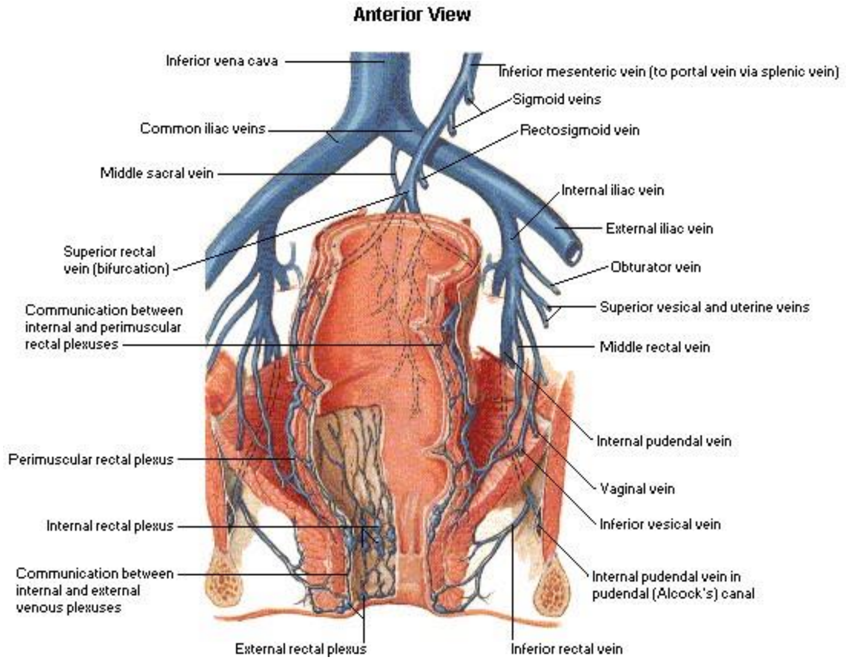
It is a small artery which arise from the posterior surface of the aorta immediately above its bifurcation. It descends On the vertebral column in the median plane to the coccyx. It gives the following branches:

- The fifth lumbar arteries.
- Small branches which supply the back of the rectum.
- Anastomosing branches with the lateral sacral arteries.

Veins of the pelvic wall:

Internal iliac vein: It passes along the internal iliac artery superior to it. It receives veins which correspond to the branches of the artery except the umbilical. The right umbilical vein disappears during the fetal life and the left one is obliterated to form the ligamentum teres of the liver.

Median sacral vein: It passes along the median sacral artery but ends in the left common iliac vein.


Anterior View
Inferior vena cava
Inferior mesenteric vein (to portal vein via splenic vein)
Sigmoid veins
Common iliac veins
Rectosigmoid vein
Middle sacral vein
Internal iliac vein
External iliac vein
Superior rectal vein (bifurcation)
Obturator vein
Superior vesical and uterine veins
Communication between internal and perimuscular rectal plexuses
Middle rectal vein
Internal pudendal vein
Perimuscular rectal plexus
Vaginal vein
Internal rectal plexus
Inferior vesical vein
Communication between internal and external venous plexuses
Internal pudendal vein in pudendal (Alcock's) canal
External rectal plexus
Inferior rectal vein

LYMPHATICS ON THE PELVIC WALL:

The lymph nodes and vessels of the pelvic wall are arranged like a chain along the main blood vessels of the pelvic wall. The lymph nodes are named after the arteries which they accompany. These are

External iliac lymph nodes: They receive lymph vessels from:
- Urinary bladder
- Prostate or Uterus
- Lower limb
- abdomen

Internal iliac lymph nodes: Runs along the artery and its branches.

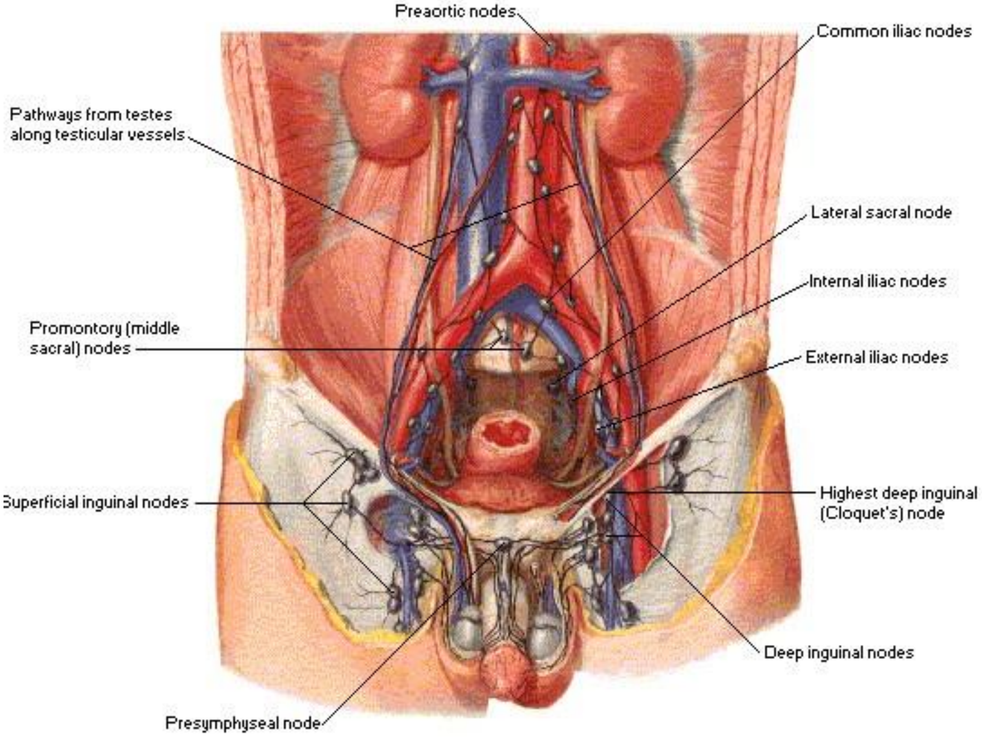
They receive from:
- Pelvic organs.
- Perineum.
- Gluteal region of the lower limb.

Sacral lymph nodes: lie along the median and lateral sacral arteries.

They drain:
- Dorsal wall of the pelvis.
- Rectum.
- neck of the urinary bladder and prostate or cervix of the uterus.

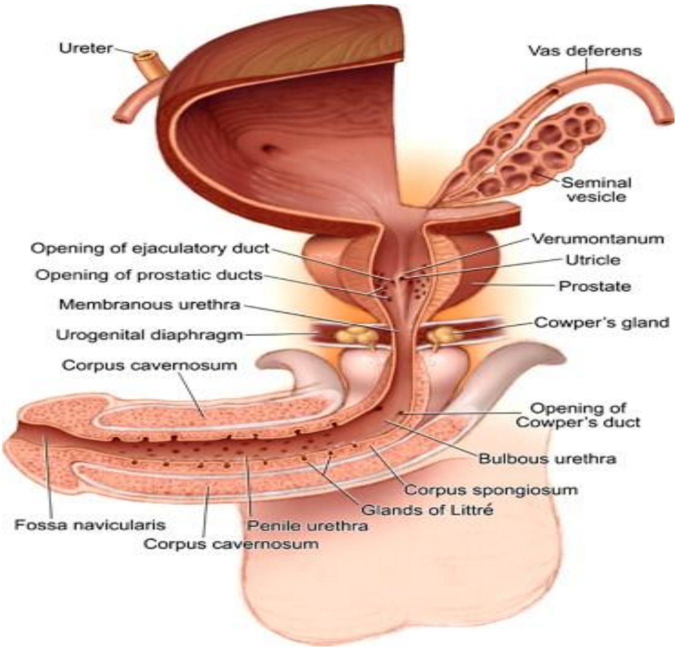
Common iliac lymph nodes: They drain all the other groups.

They receive from:
- External iliac lymph nodes.
- Internal iliac lymph nodes. Sacral lymph nodes.


Preaortic nodes
Common iliac nodes
Pathways from testes along testicular vessels
Lateral sacral node
Internal iliac nodes
Promontory (middle sacral) nodes
External iliac nodes
Superficial inguinal nodes
Highest deep inguinal (Cloquet's) node
Deep inguinal nodes
Presymphyseal node

The male genital organs

Prostate



It is a fibromuscular glandular organ.

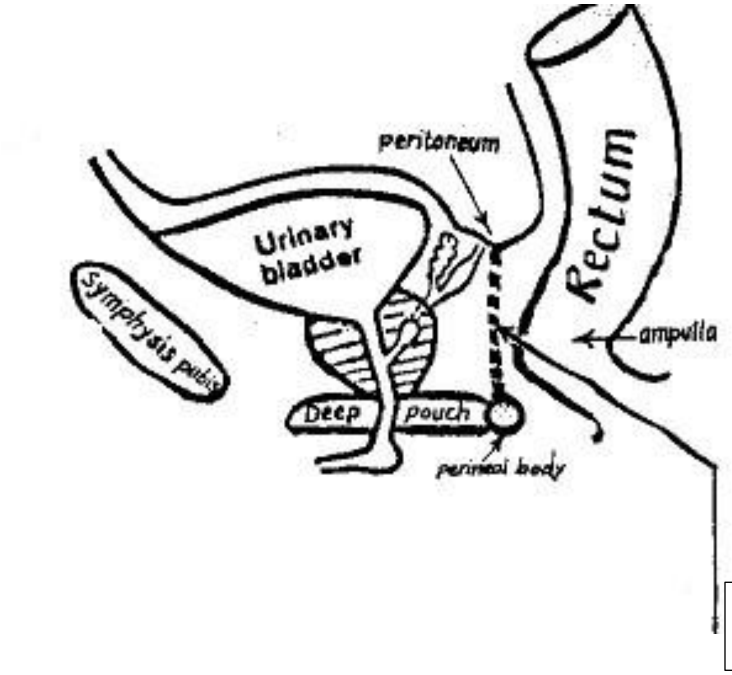
Position:

It lies in the true pelvis, below the neck of the urinary bladder (surrounds the prostatic urethra), 2 cm behind the lower border of symphysis pubis.

Shape: inverted cone. It has a base, an apex, & 4 surfaces (anterior, posterior & 2 lateral surfaces).

Size: It measures 3 cm long, 4 cm broad (across the base) & 2 cm anteroposterior.

Weight: 8 grams.



recto vesical septum (fascia of Denovilliers).

Surfaces & relations:

The base is directed upwards below the neck of the bladder.

The urethra pierces the centre of the base.

The apex is directed downwards and lies on the pelvic floor

The posterior surface: It lies in front of the ampulla of rectum, separated from it by the recto vesical septum (fascia of Denovilliers).

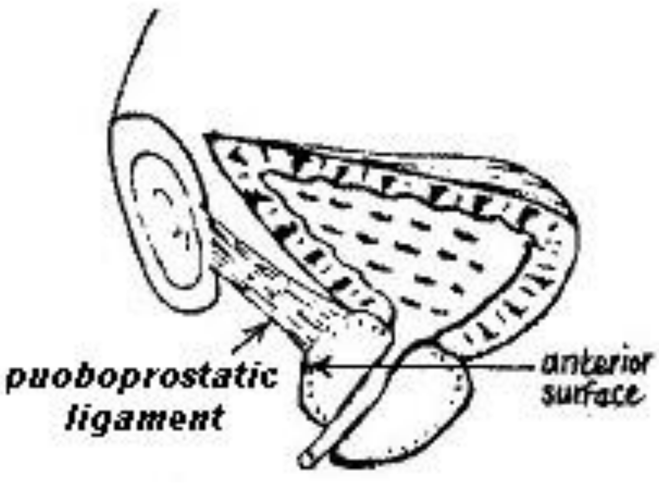
The ejaculatory ducts enter this surface near its upper border.

The anterior surface:

It is a narrow convex surface extending from the base to apex.

It lies 2 cm behind symphysis pubis &separated from it by the retro pubic space, that is filled with fat & a venous plexus.

Its upper part is connected to the back of the pubic bone by puboprostatic ligaments that lie on either side of middle line.



The urethra emerges from this surface just above the apex.

The lateral surfaces are embraced by the anterior fibers of levator ani muscle& separated from it by prostatic venous plexus.

The **prostate is traversed by:**

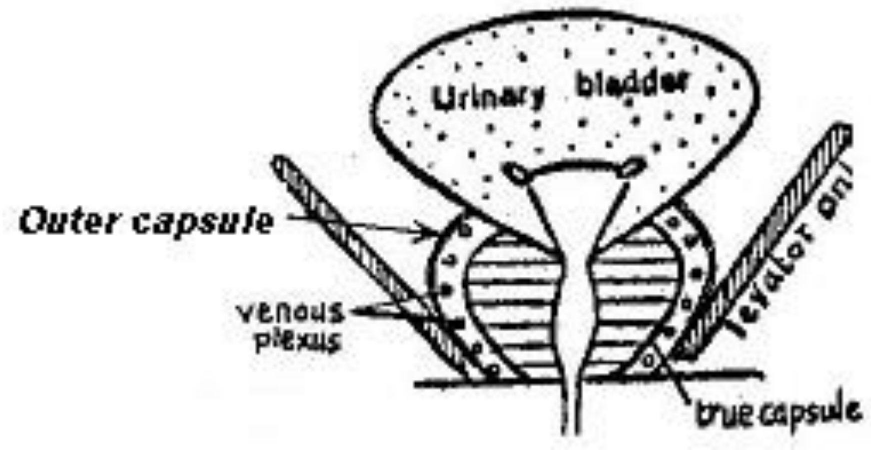
1-Urethera: from the base to the anterior surface near the apex. 2-The ejaculatory ducts: pass through the posterior part of the upper 1/2, directed downwards, forwards & medially on each side of the median to open into the prostatic urethra.

3- Prostatic utricle: Is a small blind sac 6-10 mm long. It passes downwards & forwards to open into prostatic urethra.

Capsules of the prostate:

1-Outer false capsule (prostatic sheath): it is formed by condensation of pelvic fascia. It is connected to the back of the pubis by puoboprostatic ligaments.

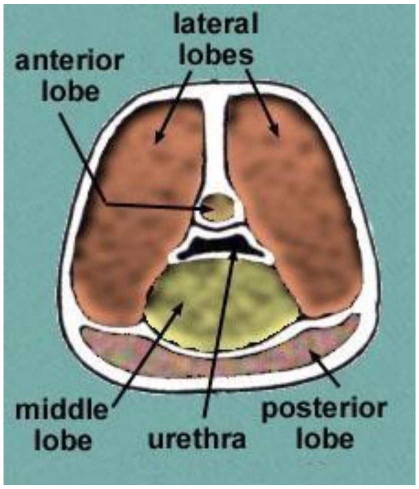
2- Inner true capsule: It is a fibromuscular sheath forming the outer surface of the gland. It is separated from the false capsule by the prostatic venous plexus.

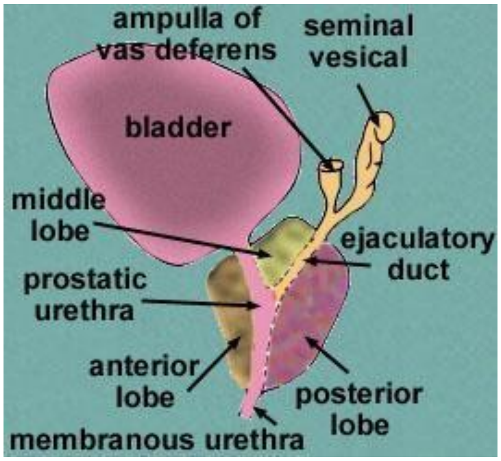


Lobes of the prostate:

The urethra & ejaculatory ducts incompletely divide the prostate into 5 lobes:

1. Anterior lobe: in front of the prostatic urethra It is formed of fibromuscular tissue & it is devoid of glandular tissue.
2. Middle lobe: behind the prostatic urethra and between the two ejaculatory ducts. It contains much glandular tissue.
3. Posterior lobe: behind the prostatic urethra and below the two ejaculatory ducts
4. Two lateral lobes: Right & left on each side of ejaculatory ducts.





Arterial supply:

Branches from inferior vesical & middle rectal arteries.

Venous drainage: into the prostatic plexus which lies between the true & false capsule. It drains into the internal iliac veins.

The prostatic venous plexus receives also:

1-the deep dorsal veins of penis.

2- the valve less veins of Bateson connecting it with the internal vertebral venous plexus.

Lymph drainage: into internal iliac & sacral lymph nodes.

Clinical Considerations:

1--senile enlargement of the prostate: After the age of 50 the median lobe may enlarge & encroach on the neck of the urinary bladder. This may cause obstruction to the flow of urine.

2--Cancer prostate spreads to the vertebral column via the valve less veins of Batson.

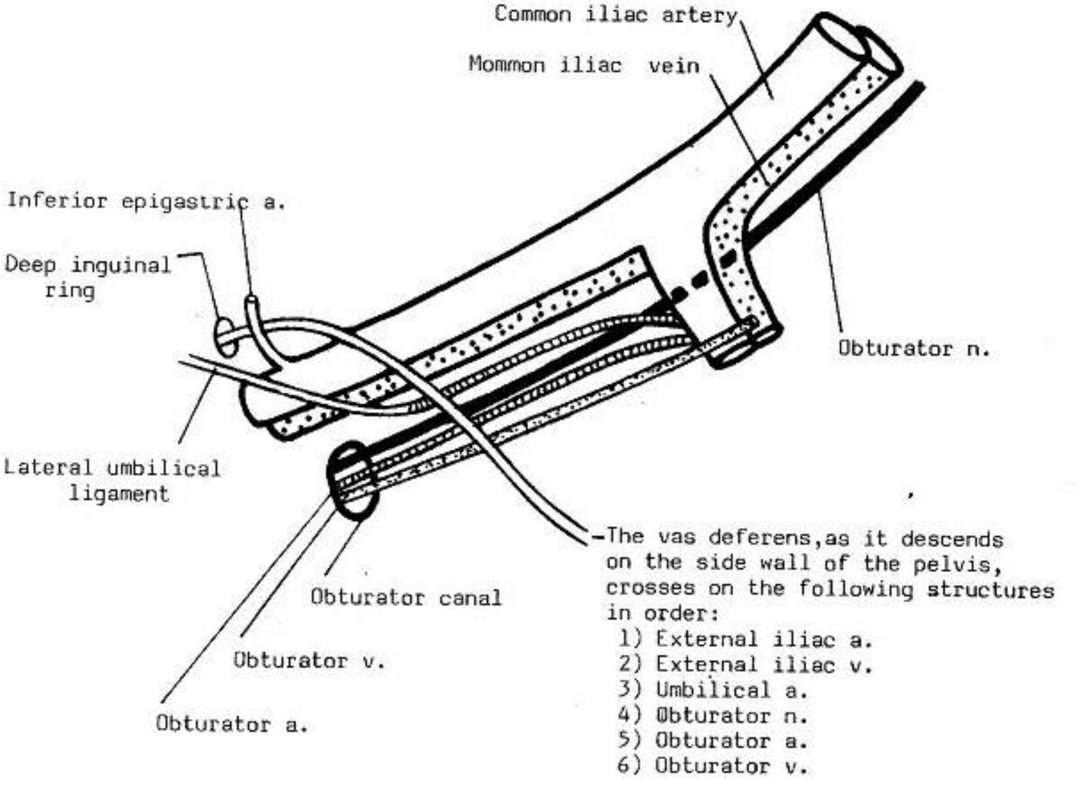
The vas deferens:

The vas deferens is a muscular tube (45 cm) which transmits the sperms from the epididymis to the prostatic urethra. It begins in the scrotum as a continuation of the tail of the epididymis. Its course is divided into 3 parts:

1-scrotal part: ascends on the back of the testis & medial to the epididymis till the upper pole of the testis then it ascends in the posterior part of the spermatic cord, surrounded by the Pampiniform plexus of veins.

2-Inguinal part: It enters the superficial inguinal ring, runs upwards & laterally through the inguinal canal to reach the deep inguinal ring.

3-Pelvic part: At the deep inguinal ring, the vas leaves the spermatic cord & curves round the lateral side of the inferior epigastric artery. Then it passes backwards & downwards on the lateral wall of the pelvis crossing superficial to external iliac vessels, obliterated umbilical artery & the obturator nerve and vessels. At the level of the ischial spine it turns medially crossing over the terminal part of ureter. It then descends medial to the seminal vesicle on the posterior surface (base) of the urinary bladder. In this part it is dilated forming the *ampulla* of the vas deferens. The vas then joins the duct of the seminal vesicle forming the ejaculatory duct.



-The vas deferens,as it descends on the side wall of the pelvis, crosses on the following structures in order:
1) External iliac a.
2) External iliac v.
3) Umbilical a.
4) Obturator n.
5) Obturator a.
6) Obturator v.

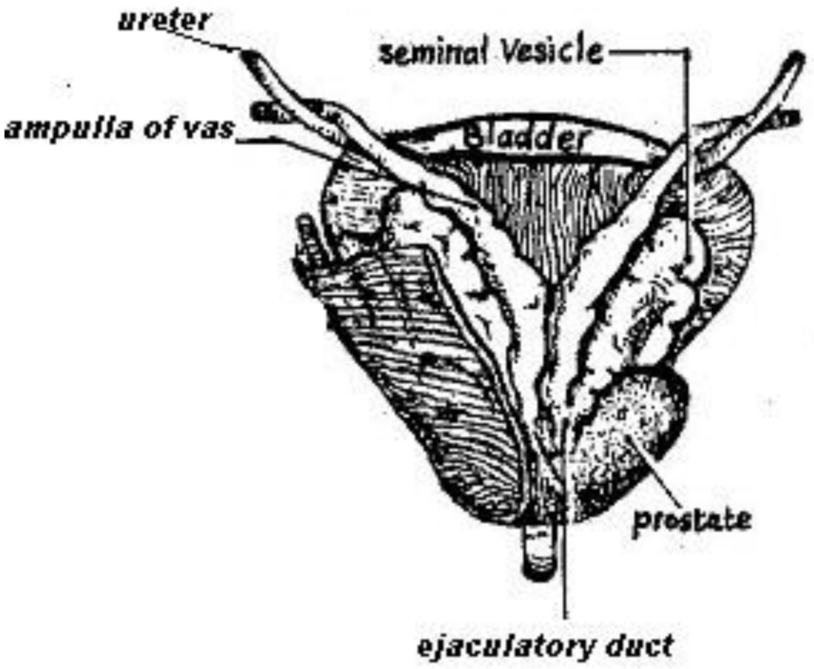
Arterial supply: the artery of the vas (branch of inferior vesical artery)

The seminal vesicles: It is a lobulated sac with a blind upper end. It is pyramidal in shape and about 5 cm. long. The apex of the pyramid is directed downwards to join the duct of the vas deferens forming the ejaculatory duct.

Relations:

- *Anteriorly*: It is related to the base of the urinary bladder.
- *Posteriorly*: It is related to the rectum.
- *Medially*: It is related to the ampulla of the vas deferens.

- *inferiorly*: It is related to the base of the prostate.
- *Blood supply*: inferior vesical & middle rectal arteries.



The ejaculatory ducts:

It is formed of by the union of the vas deferens and the duct of the seminal vesicle behind the neck of the urinary bladder. It is about 2 cm. long. Each ejaculatory duct pierces the upper part of the posterior surface of the prostate. It passes downwards & forwards lateral to the prostatic utricle to open in the prostatic urethra on the seminal colliculus.

The male external genitalia:

The **penis: It** is the male organ of micturition & copulation.

Parts:

1)**Root** which is the attached part & it lies in the perineum.

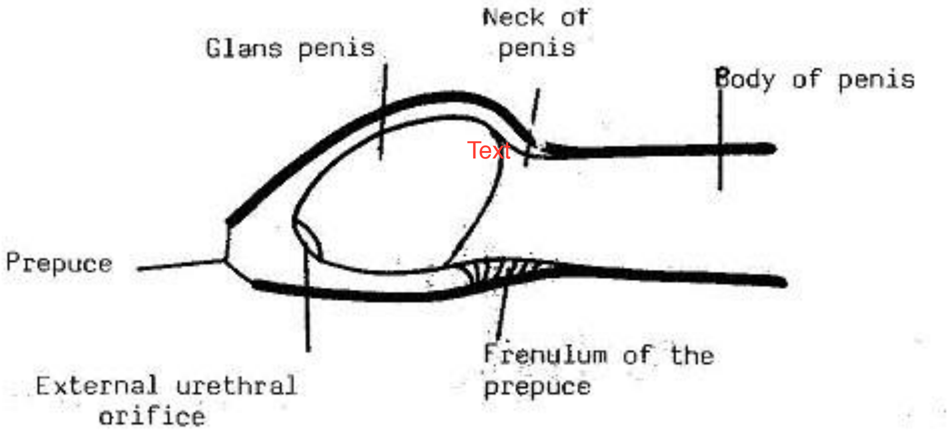
2) Body of the penis is the free part& is completely enveloped in skin. The body is formed of 3 cylindrical masses of erectile tissue, surrounded by a tubular sheath of fascia.

The erectile tissue; is formed of:

1-Two corpora cavernosa: united side by side on the dorsum of the body of the penis.

2-A single corpus spongiosum. In the ventral side of the body, in the groove between the 2 corpora cavernosa. At the distal end of the body, the corpus spongiosum expands to form the glans penis.

- The glans penis is covered by a fold of skin called the prepuce which project from the body of the penis. The prepuce is connected to the inferior surface of the glans by a fold of skin called the frenulum. Most of the prepuce is removed by circumcision.
- The urethra: passes through the bulb, corpus spongiosum & glans. It opens on the tip of the glans by the external ureteral orifice.



Coverings:

1- Skin: thin, elastic, devoid of hairs & loosely attached to the underlying fascia.

2- Superficial fascia: 2 layers:

a-superficial layer of loose areolar tissue devoid of fat.

b-deep membranous layer which envelops the 3 masses of erectile tissue.

Ligaments of penis:

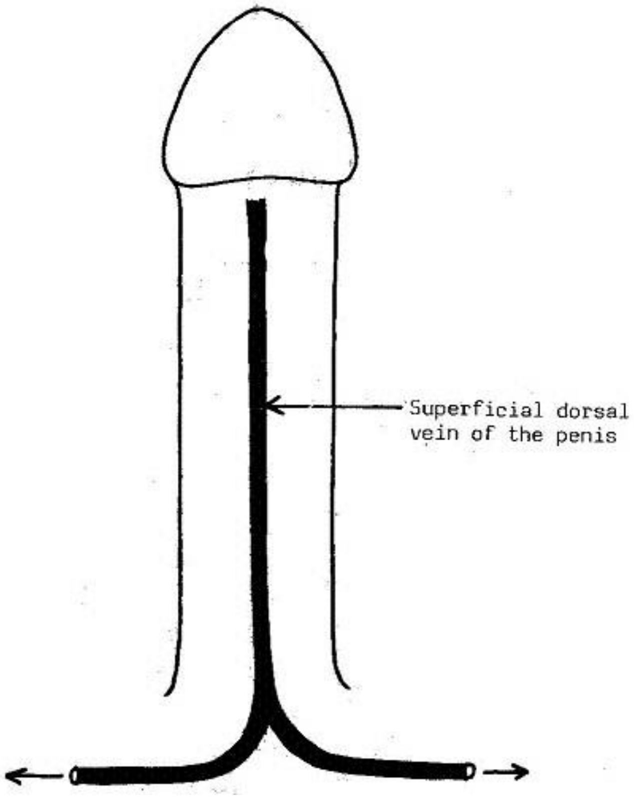
1- Fundiform ligament: arises from the lower end of linea alba& splits into 2 lamellae which encircle the penis & unite below its body.
2- Suspensory ligament of penis: is triangular. It is attached above to the front of symphysis pubis & below to the body of penis.

Arteries of the penis:3 branches from each internal pudendal artery

1- artery of the bulb: passes through the corpus spongiosum below the urethra.
2- deep artery of the penis : each artery passes through the corpus cavernosum & supplies it.
3- dorsal artery of penis : passes on the dorsum of the penis , beneath the fascial sheath , one on each side of the deep (dorsal vein) . It supplies the glans penis.

Veins of the penis : are present in the median plane of the penis:

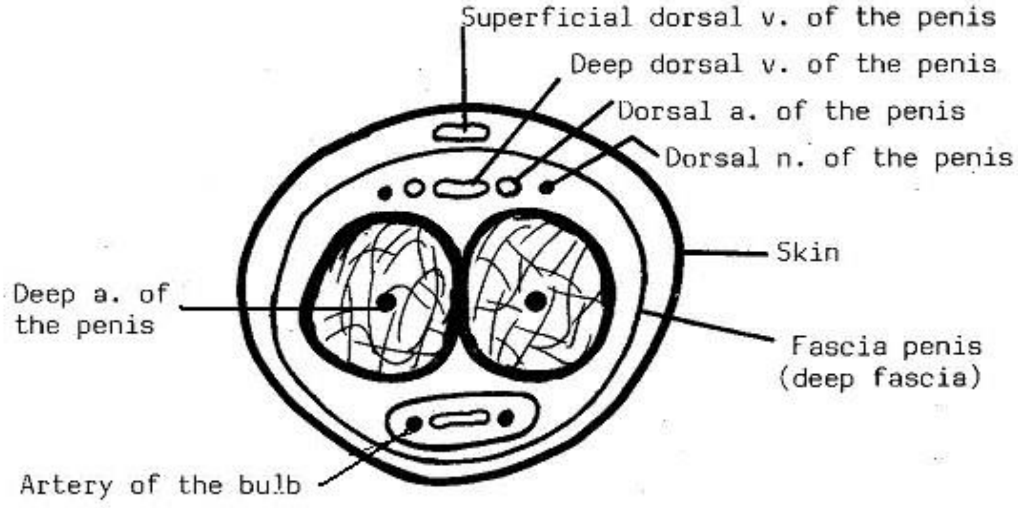
1- Superficial dorsal vein: passes backwards in the superficial fascia., it divides into right & left veins which end in the external pudendal vein of the same side.
2- Deep (dorsal) vein; passes backwards beneath the fascial sheath. It enters the pelvis below the symphysis pubis, to join the prostatic plexus of veins.



Nerves of the penis:

1-dorsal nerve of penis: (branch of pudendal nerve) : one on each side , lateral to the dorsal artery of penis.

2- pelvic plexus.


Superficial dorsal v. of the penis
Deep dorsal v. of the penis
Dorsal a. of the penis
Dorsal n. of the penis
Skin
Deep a. of the penis
Fascia penis (deep fascia)
Artery of the bulb

SPERMATIC CORD

The spermatic cord is a group of structures which passes through the inguinal canal, to and from the testis.

It begins at the deep inguinal ring and ends at the testis.

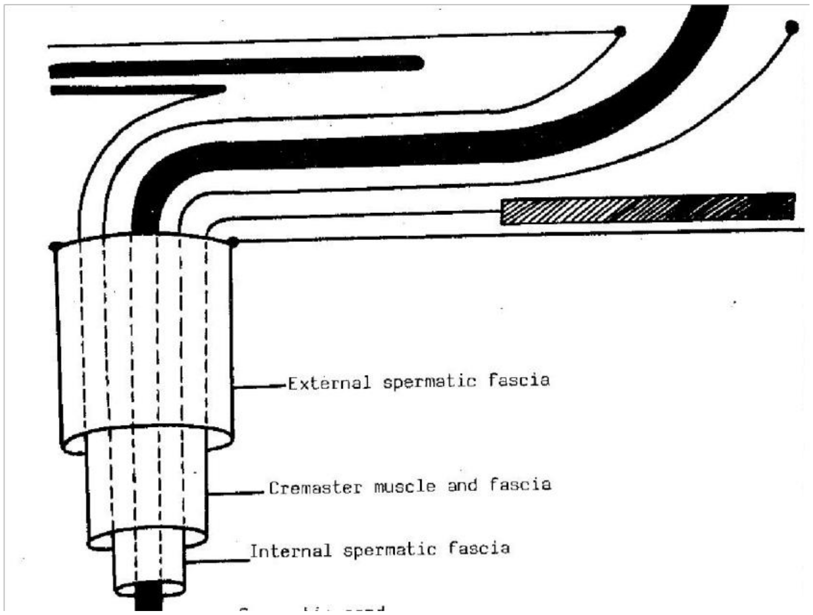
It is covered by 3 layers of fasciae derived from the layers of the anterior abdominal wall.

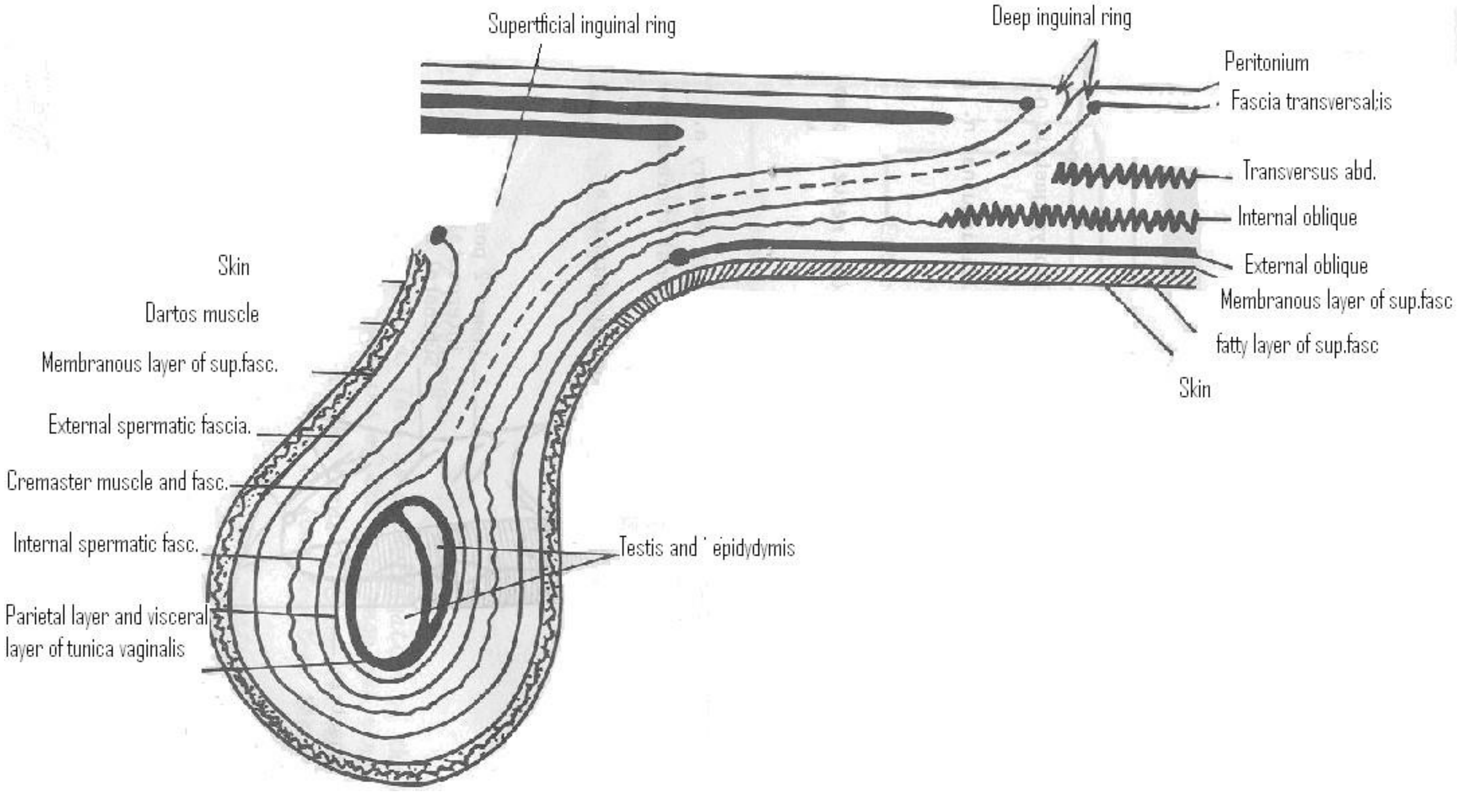
Coverings of spermatic cord: from outside inwards

Outer layer: external spermatic fascia (derived from external oblique aponeurosis).

Middle layer: cremaster muscle and fascia (derived from internal oblique muscle).

Internal layer: internal spermatic fascia (derived from fascia transversalis).


External spermatic fascia
Cremaster muscle and fascia
Internal spermatic fascia

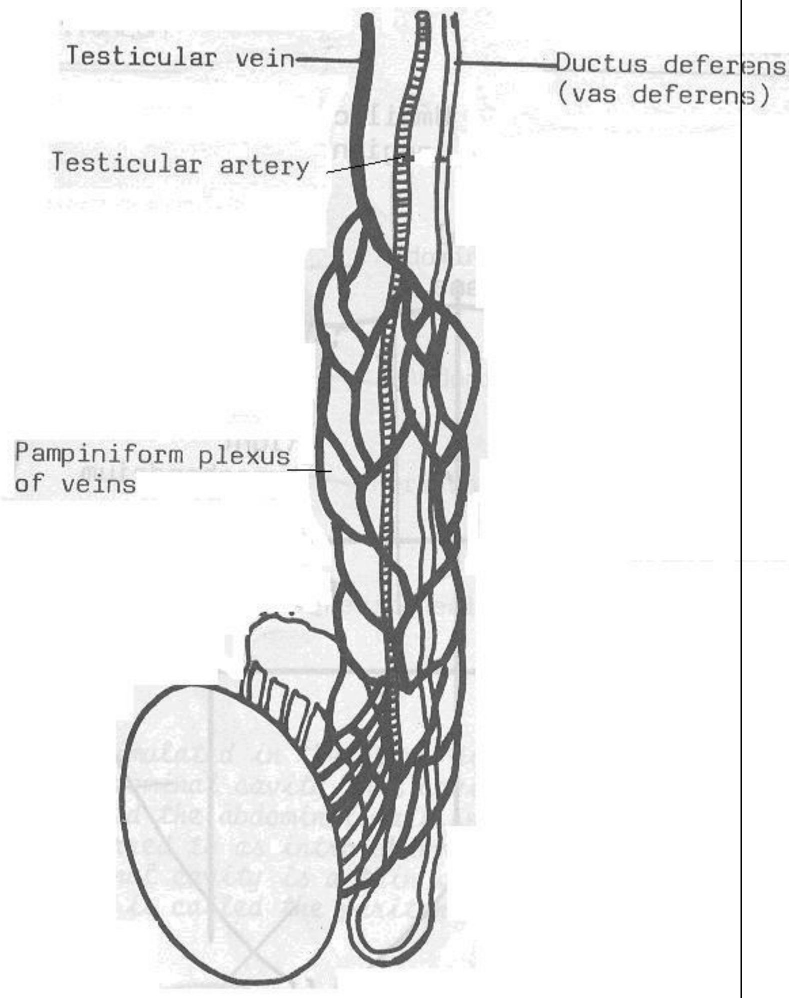

Superficial inguinal ring
Deep inguinal ring
Peritonium
Fascia transversalis
Transversus abd.
Internal oblique
External oblique
Membranous layer of sup.fasc
fatty layer of sup.fasc
Skin
Skin
Dartos muscle
Membranous layer of sup.fasc.
External spermatic fascia.
Cremaster muscle and fasc.
Internal spermatic fasc.
Parietal layer and visceral layer of tunica vaginalis
Testis and ' epidydymis

Structures of spermatic cord:

1-Vas deferens: it is a duct which carries the spermatozoa from the epididymis to the urethra. It is a cord-like structure when palpated between the finger and the thumb at the upper part of the scrotum.

2-Testicular artery:
It is a branch from the abdominal aorta.
It supplies the testis and epididymis. 3-Artery to the vas deferens: is a branch from superior or inferior vesical artery. It supplies the vas deferens.
4-Cremasteric artery: It is a branch from inferior epigastric artery.
It supplies the cremaster muscle and fascia.
5-Pampiniform plexus of veins: carries venous blood from the testis and epididymis. At the deep inguinal ring the plexus forms a single testicular vein.
6- Genital branch of genitofemoral nerve: supplies motor fibres to the cremaster muscle and sensory fibres to the tunica vaginalis.

7-Sympathetic fibres around testicular artery and artery to vas deferens: they supply the testis and epididymis.



SCROTUM, TESTIS AND EPIDIDYMIS

The scrotum

It is a bag placed below and behind the body of the penis.

It is divided by a septum into 2 compartments, each of which contains a testis, epididymis, lower end of spermatic cord and a serous sac called tunica vaginalis.

Layers of the scrotum: from outside inwards:

Skin: is dark and wrinkled. It has a median ridge which extends from the root of the penis to the anus.

Superficial fascia: is devoid of fat which is replaced by a thin sheet of involuntary muscle called dartos muscle. The dartos muscle sends an incomplete septum into the scrotum to divide it into 2 chambers.

It is lined by membranous layer (Colles' fascia). Both dartos muscle and the membranous layer are continuous with the superficial fatty and deep membranous layers of superficial fascia of lower part of anterior abdominal wall.

N.B.: the wall of each chamber contains- beside the skin and dartos muscle – 3 other layers derived from anterior abdominal wall.

a. External spermatic fascia: derived from external oblique aponeurosis.

cremaster muscle and fascia: derived from internal oblique muscle. Arterial supply of the scrotum: it receives scrotal branches from internal and external pudendal arteries.

Nerve supply:

Dartos muscle: is supplied by genitofemoral nerve (genital branch). (or by sympathetic nerve fibres according to some authors).

Skin:

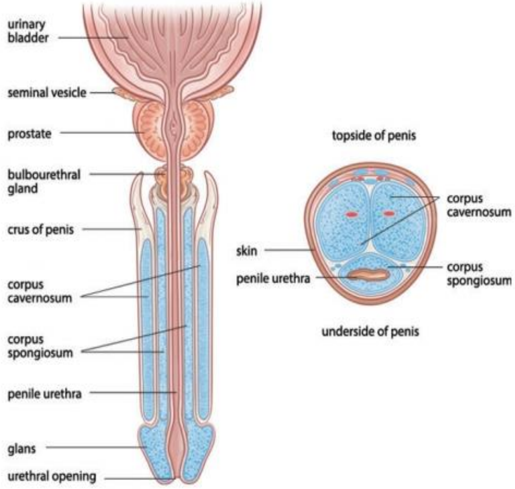
anterior 1/3 : is supplied by Ilio-inguinal nerve (L1),

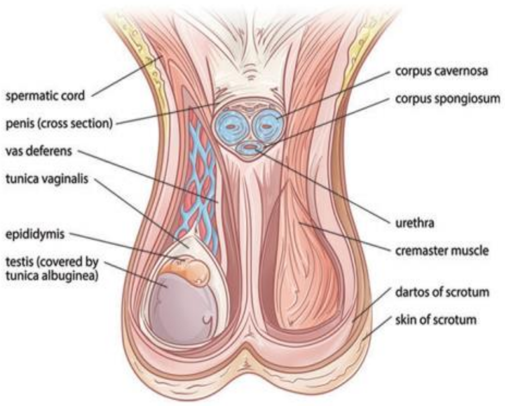
Posterior 2/3 : are supplied by scrotal branches from perineal nerve and posterior cutaneous nerve of thigh(S3).

Lymph vessels: end in superficial inguinal lymph nodes

c.Internal spermatic fascia: derived from fascia transversalis.

The Testis





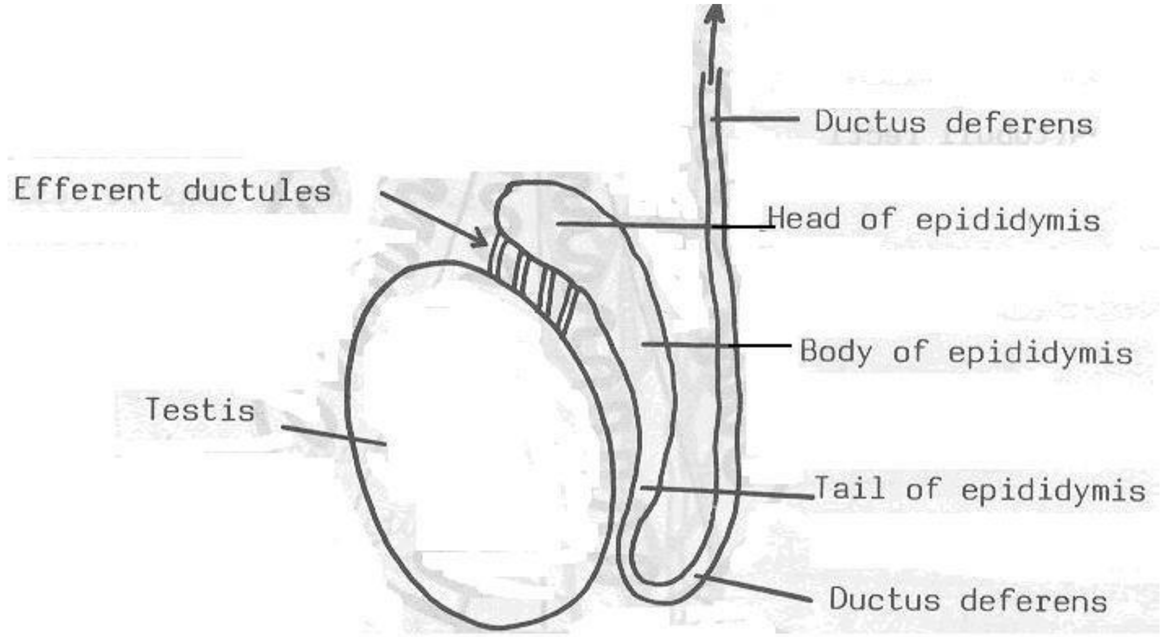
It is the male reproductive gland.

It is white in colour and oval in shape.

Each testis lies in one of the chambers of the scrotum, and it supper end is connected with the spermatic cord.

The left testis usually lies at a lower level than the right testis.

It is surrounded by a fibrous capsule called tunica albuginea, and is covered by the visceral layer of the tunica vaginalis.



Arterial supply of the testis: testicular artery (branch from abdominal aorta).

Veins of the testis:

right testicular vein which ends inferior vena cava.
Left testicular vein which ends in left renal vein.

Nerves of testis: receives sympathetic fibres from renal and aortic plexuses.

Lymph vessels: ascend in the spermatic cord to end in para-aortic lymph nodes

The **Epididymis**

The epididymis is a comma-shaped structure formed of a coiled duct about 6 meters long when it is uncoiled.

It is attached to the posterior border of the testis lateral to the vas deferens.

It has 3 parts;

Head: is the large upper end. It lies on the upper end of the testis and is connected to it by efferent ductless.

Body: is the middle part of the epididymis. It is separated from the testis by a groove called sinus of epididymis.

Tail: is the lower part of the epididymis. It is continuous with the vas deferens.

Arteries, veins, nerves and lymph vessels: are similar to those of the testis.

Tunica Vaginalis

It is a closed serous sac invaginated from behind by the testis and epididymis.

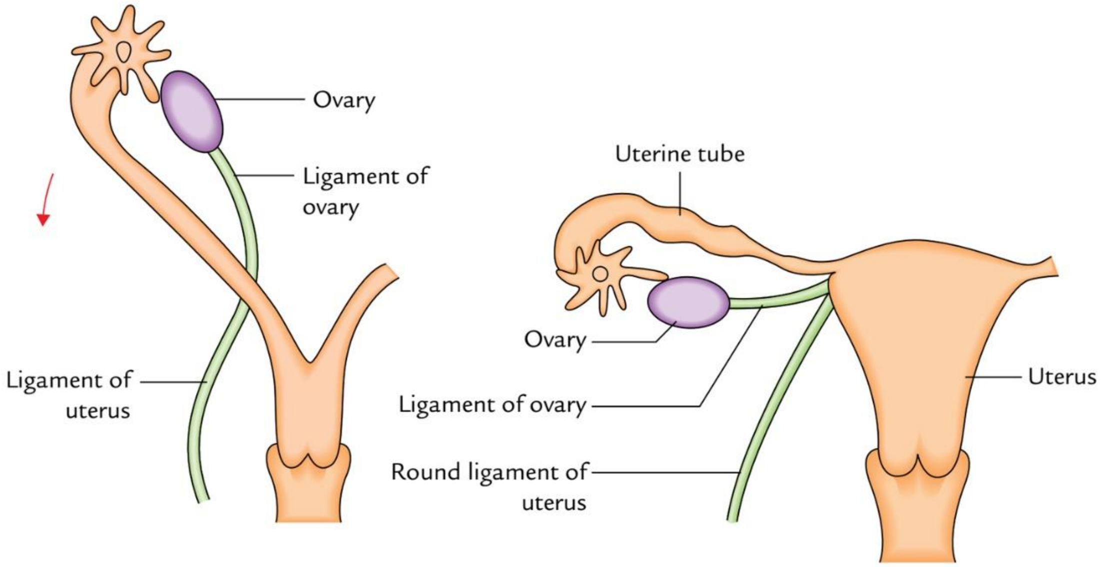
Its parietal layer lines the scrotal chamber.

Its visceral layer covers the testis and epididymis.

On the lateral side: the visceral layer is pushed between the epididymis and the testis to line a groove called sinus of epididymis

Female genital organs

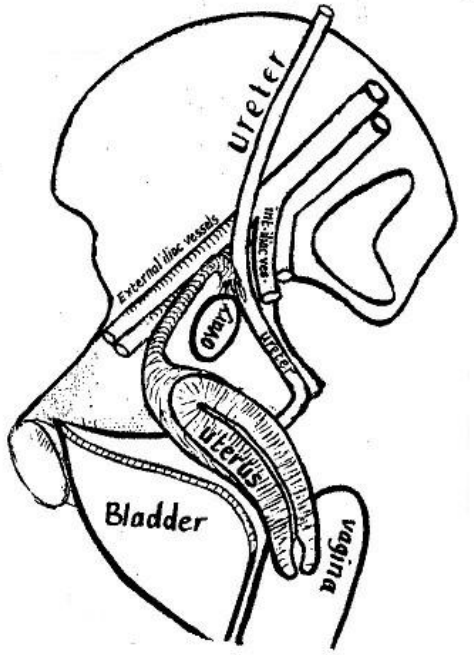
THE OVARY

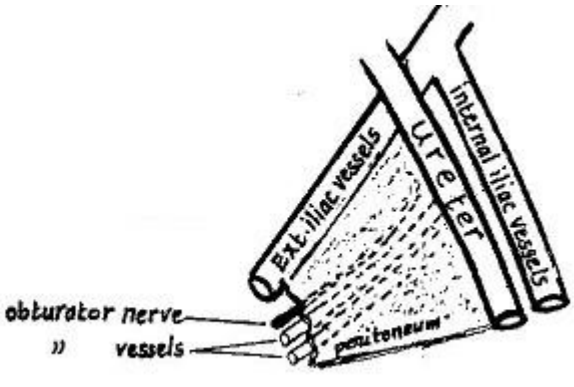


It is the female primary sex organ.

Position: It lies in the ovarian fossa on the lateral wall of the true pelvis.

Shape & dimensions: it is almond shaped, 3 cm. long, 2 cm wide & 1 cm thick.





- **External Features:**

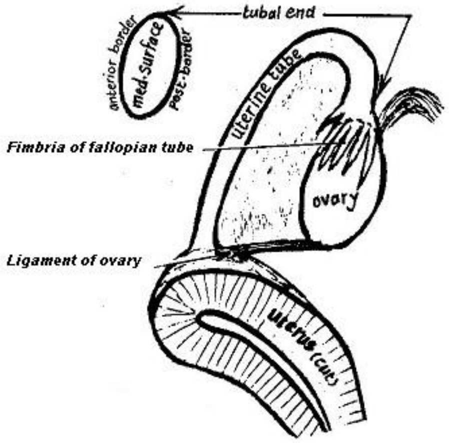
Before puberty → grayish pink & smooth.
After puberty → grayish with puckered surface.
At old age → becomes atrophic.

The ovary has:

2 surfaces: medial & lateral.
2 ends: Upper (tubal) & lower (uterine).
2 borders: Anterior (mesovarian) & posterior (free).

Relations:

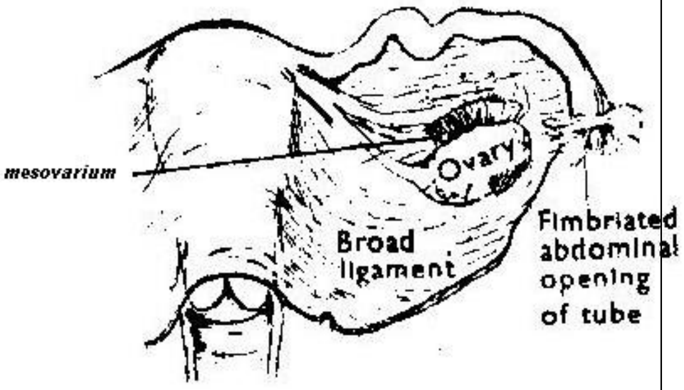
Lateral Surface: related to peritoneum of the ovarian fossa on the lateral wall of pelvis, which separates the ovary from the obturator nerve & vessels.
Medial Surface: covered by the fimbria of uterine tube.



Upper (tubal) End: is attached to

1-the ovarian fimbria of the uterine tube 2-the suspensory ligament of the ovary.
Lower (uterine) End: is connected to the uterotubal junction by the ovarian ligament.

Mesovarian (attached) border: attached to the posterior surface of the broad ligament by the mesovarium.



Posterior (free) border: related to the lateral curved end of the uterine tube

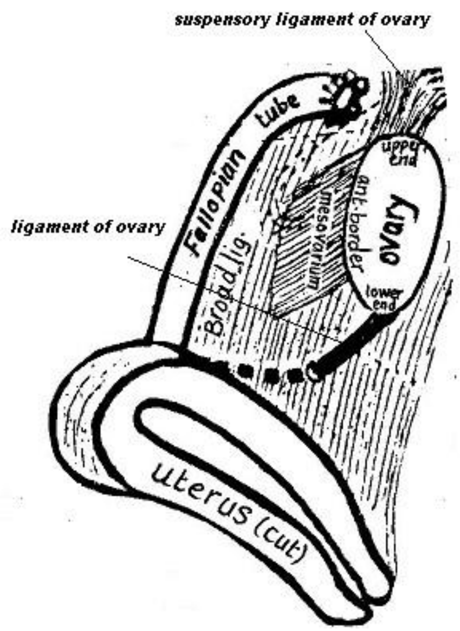
Therefore, the uterine tube has a triple relation to the ovary; it's related to its upper end, its posterior border, and its medial surface.

Ligaments of the Ovary:

ligament of the ovary: connects the uterine end of the ovary with the uterotubal junction.

Mesovarium: a short peritoneal fold which connects the ovary to the posterior(superior) surface of the broad ligament.

Suspensory ligament of the ovary: is the part of the broad ligament lateral to the end of uterine tube. It connects the upper end of the ovary to the side wall of the pelvis.



Blood Supply of the Ovary

- Arteries:
  - By the ovarian artery which is a branch of abdominal aorta.
- Veins:
  - Veins draining the ovary form a plexus around the ovarian artery (Pampiniform plexus).
  - The plexus pours into a single ovarian vein. ○ Right ovarian vein → inferior vena cava.
  - Left ovarian vein → left renal vein.

Lymph drainage

- To the lateral aortic lymph nodes.

Nerve Supply

- Autonomic nerves along the ovarian artery.

CLINICAL SIGNIFICANCE

OVARIAN TORSION

The torsion of an ovary may take place because of an abnormally long mesovarium and suspensory ligament of the ovary.

PROLAPSE OF OVARIES

The ovaries are frequently prolapsed/ displaced into the pouch of Douglas where they can be palpated on per vaginal (PV) evaluation.

OVARIAN CYST

- One or more small ovarian cysts could be created because of the developmental arrest of the ovarian follicles.
- A large ovarian cyst with an encysted fluid could possibly be created from the corpus luteum of the pregnancy. It causes an anteroposterior bulging of the abdomen but doesn't present shifting dullness. It ought to be discerned from ascitis, which presents with shifting dullness.

OVARIAN CARCINOMA

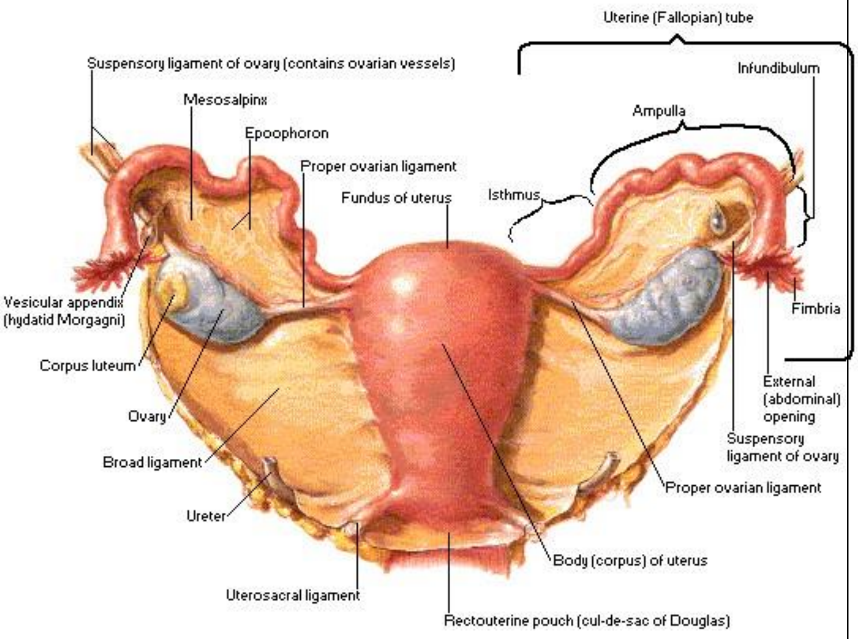
The carcinoma of an ovary is common and accounts for about 15% of all cancers and 20% of gynecological cancers.

TERATOMA

The ovary may occasionally include pluripotent cells, which may generate teratomas.

The Uterine (Fallopian) Tubes

- These are a pair of tubes, which run in the free upper border of the broad ligament.
- Each tube is 10 cm long.
- Its medial end opens into the superior angle of the uterine cavity at the junction of the fundus with the body.
- Its lateral end opens into the peritoneal cavity close to the ovary. This end is called the fimbrated end because it is surrounded by irregular projections called fimbriae. One of these fimbriae is large & extends to the upper end of the ovary & is called the ovarian fimbria.



Parts of the Uterine Tube:

- From lateral to medial, the tube is divided into 4 parts:

1) Infundibulum: (2 cm long) o Is the funnel shaped lateral part of the tube, which opens into the peritoneal cavity near the ovary. o Its margins have 20-30 irregular processes called the fimbriae, which help to trap the ova into the uterine tube during ovulation.

2) Ampulla: (5 cm long) o It is the widest & longest part of the tube.

o It is the site of fertilization.

3) Isthmus (2 cm) It is the narrow medial end of the tube.

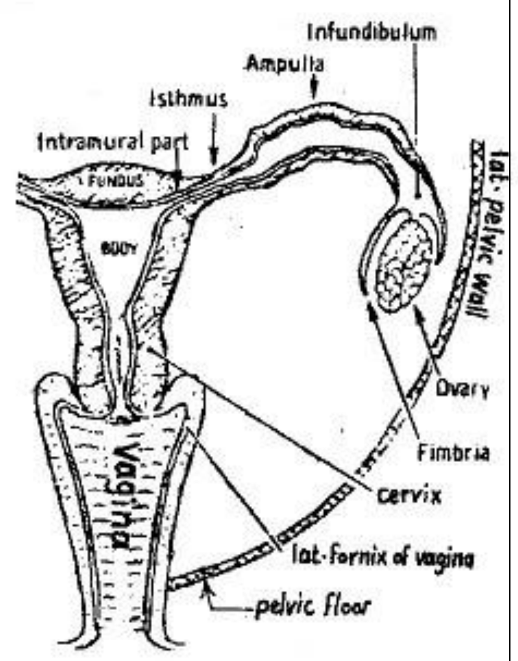
4) Intramural part (1 cm) o It is the part which passes inside the uterine wall to open into the uterine cavity. It is the narrowest part of the whole tube.

Blood Supply of the Uterine Tube:

- Medial 2/3 of the tube → by uterine vessels.
- Lateral 1/3 → by ovarian vessels.

o Nerve Supply: Autonomic nerves from the pelvic plexus.

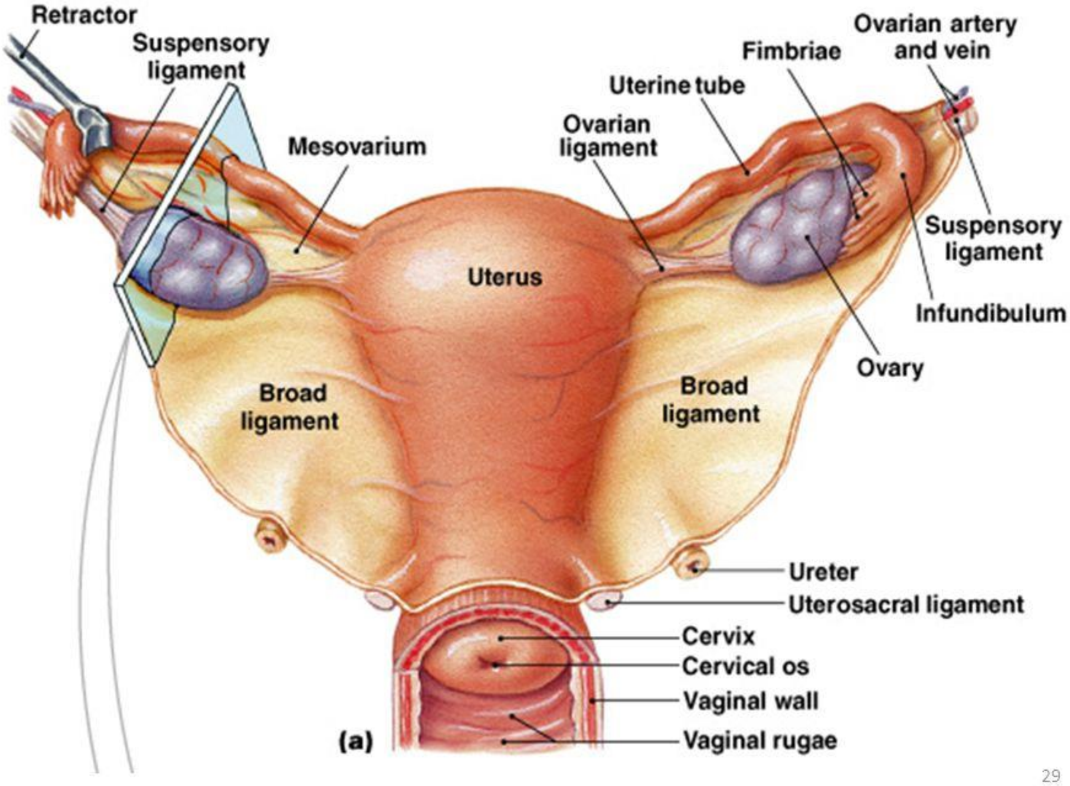
o Lymph Drainage: To lateral aortic lymph nodes.



o Applied Anatomy:

1. Blockage of the uterine tubes (as due to infection) is a cause of sterility in women.
2. As the lateral end of the tube opens into the peritoneal cavity, infection in the uterus or tubes may lead to peritonitis.
3. Ligation of the uterine tubes is one method used for birth control.

The Uterus



29

Shape: Pear shaped, thick walled hollow muscular organ.

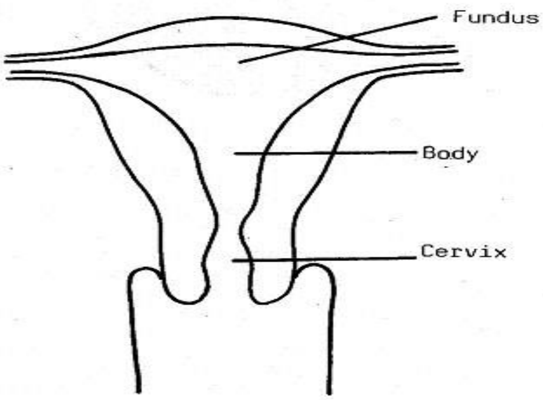
Dimensions:

- Length: 3 inches.
- Breadth: 2 inches.
- Thickness: 1 inch.

It is formed of 3 parts: fundus, body & cervix.

1. **Fundus:**

Is the dome – shaped upper part of the uterus, which lies above the entrance of the uterine tubes into the uterine wall.



2. **Body**

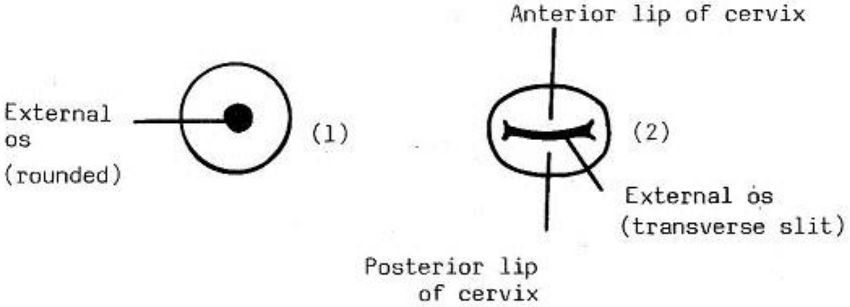
It extends from the level of the uterine tubes to a constriction called isthmus. It has a thick wall & a narrow slit-like cavity, which is continuous with the cervical canal at the internal os. The uterine tube opens at the junction of the body with the fundus.
The fundus & the body are 2 inches long. The superolateral angle of the uterus at its junction with the tube is called cornu.

3. **Cervix**

It is the part below the isthmus, one-inch long. It is cylindrical in shape

Its upper ½ lies above the vagina (supravaginal part) while its. lower ½ pierces the anterior wall of the vagina projects inside it (vaginal part).

The cavity of the cervix (cervical canal) is spindle-shaped. It opens superiorly into the uterine cavity by the internal os and inferiorly into the vaginal cavity by the external os which is small & rounded before child birth but becomes slit-shaped with anterior and posterior lips after child birth.



(1)= Cervix of uterus of a woman who had no previos delivaries (nullipara) as seen through a colposcope inserted into the vagina.

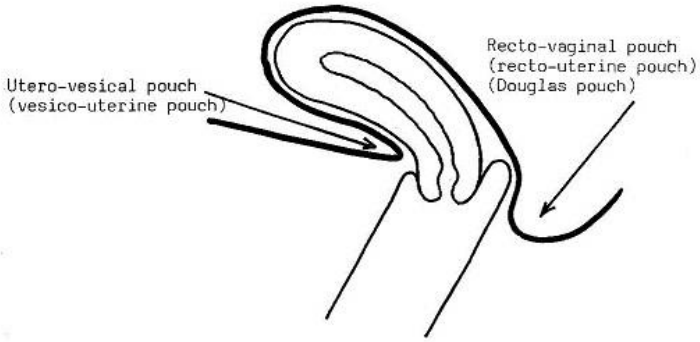
(2)= Cervix of uterus of a woman who had previous delivaries as seen through a colposcope inserted into the vagina.

Cervix of the uterus as seen through the colposcope

Normal position of uterus:

The uterus is located in the cavity of the true pelvis behind the urinary bladder & in front of the rectum.

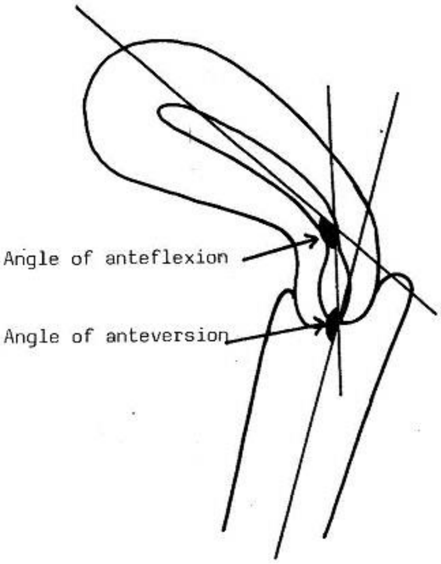
The anatomical position of the uterus is described as anteverted anteflexed
Anteverted means that the whole uterus is tilted forwards at a right angle to the vagina



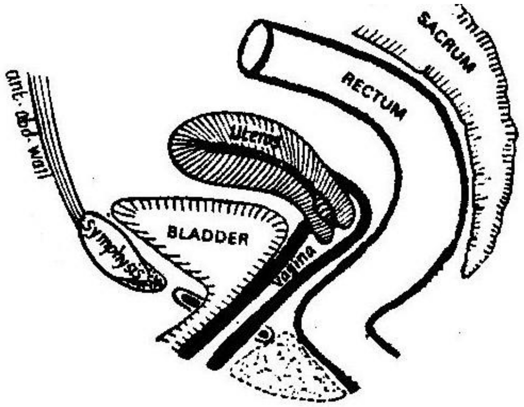
Utero-vesical pouch (vesico-uterine pouch)
Recto-vaginal pouch (recto-uterine pouch) (Douglas pouch)

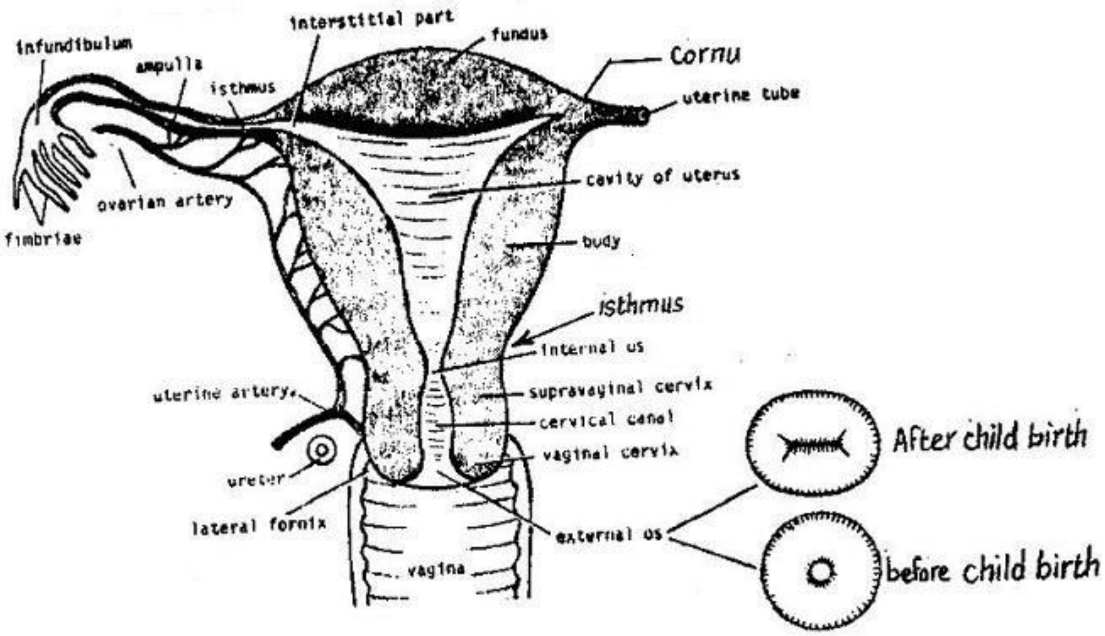
Peritoneal covering of the uterus

Anteflexed means the long axis body of the uterus is slightly flexed on the long axis of the cervix making an angle of about 170^0



The external os is directed backwards facing the posterior vaginal wall (because of the ante-verted position of the uterus



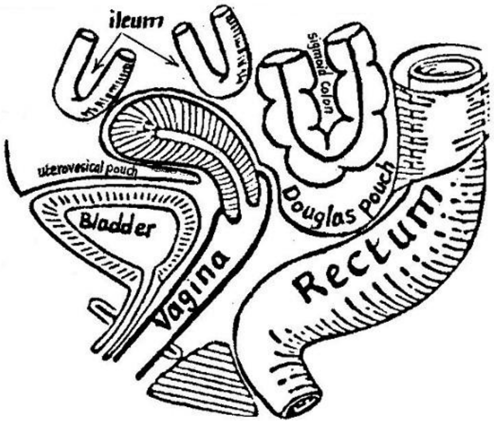


Relations of the uterus:

A-Fundus: covered by peritoneum& is related to coils of ilium.

B- Body:

1-The anterior (vesical) surface of the *body* is flat & is related to the upper surface of the urinary bladder. It is covered by peritoneum which is



reflected at the isthmus on the upper surface of the bladder forming utero-vesical pouch which contain loops of small intestine

2-The posterior (intestinal) surface of the *body is convex & is related to coils of ilium & sigmoid colon. It is covered with peritoneum which extends to the back of the cervix & upper part of the vagina& reflected back on the rectum forming Douglas pouch.*

3-Lateral margin: rounded & is attached to the broad ligament of the uterus. The uterine vessels ascend lateral to the body between the two layers of the broad ligament.

C.The cervix:

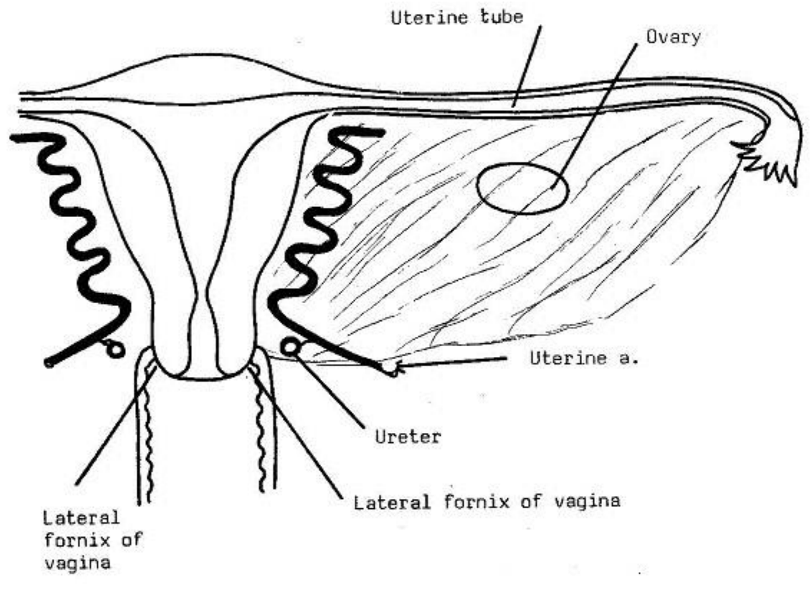
It is cylindrical in shape & has 2 parts:

The upper (supra-vaginal) part: *anteriorly*: It is not covered by peritoneum & is related to the urinary bladder.

Posteriorly: It is covered by peritoneum, Pouch of Douglas pouch & is related to ilium & sigmoid colon.

Laterally: is related to uterine artery. The ureter (runs downwards & forwards 2 cm lateral to the cervix).

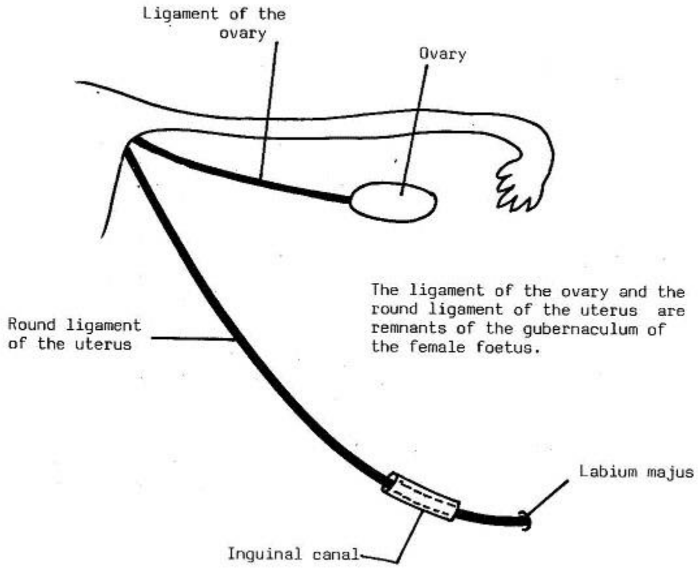
The lower (vaginal) part: The vaginal cavity surrounds the lower 1/2 of the cervix from all directions forming the fornix of the vagina.



Ligaments of the uterus:

A-Ligaments of the body:

1- *Round ligament of the uterus*: Is a fibromuscular band extending from the cornu of the uterus to the labia majora. It is attached to the upper end of the lateral margin of the body in front of the uterine tube. It passes forwards& laterally between the two layers of the broad ligament to the side wall of the pelvis. On the lateral wall of the pelvis, it crosses over the obturator nerve & vessels, obliterated umbilical artery & external iliac vessels. It enters the deep inguinal ring into the inguinal canal then it emerges from superficial ring. It ends in the subcutaneous tissue of the labium majus.

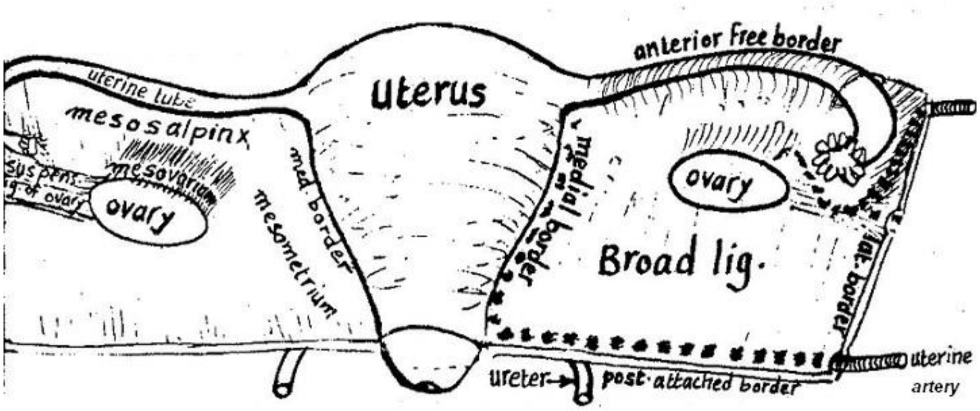


The ligament of the ovary and the round ligament of the uterus are remnants of the gubernaculum of the female foetus.

***2*-ligament of the ovary:**

It passes within the broad ligament between uterine end of ovary and to the cornu of uterus behind the entrance of the uterine tube.

3-Broad ligament of the uterus:



It is a peritoneal fold formed of two layers of peritoneum extending across the pelvic cavity from the lateral wall of the uterus medially to the lateral pelvic wall laterally. It is quadrangular in shape having four borders:

1-The medial border is attached to side of the uterus.

2-The lateral border is attached to the obturator fascia on the lateral wall of the pelvis.

3-The superior (anterior) border is free where the two layers of the fold is continuous with each other. The uterine tube occupies the medial part of this border.

4-The Inferior (posterior) border is attached to the pelvic floor (levator ani muscle) where the 2 layers of the ligament diverge from each other It has two surfaces:

- The anterior (inferior) surface is related to the urinary bladder.
- The posterior (superior) surface is related to the ileum and pelvic colon. The uterine tube pierces this surface near its end. The ovary is attached to this surface by a fold of peritoneum called the mesovarium.

Parts of the broad ligament:

Attachment of mesovarium to broad ligament divides it into:

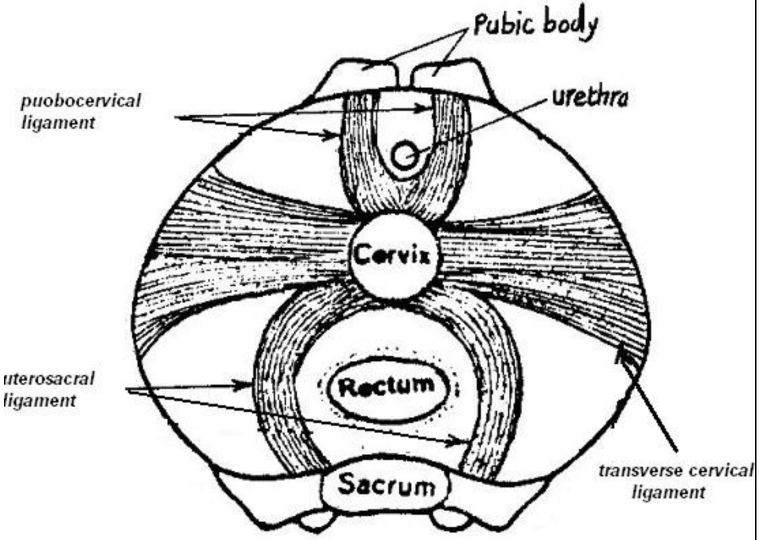
- 1-The *mesosalpnx* (mesentery of the uterine tube) which is the part above the attachment of mesovarium.
- 2-The *mesometrium* (mesentery of the uterus) which is the part of the broad ligament below the attachment of the mesovarium.

  3-The *suspensory ligament of the ovary* is the part of broad ligament lateral to the end of the uterine tube.

Contents of the broad ligament:

- The uterine tube which occupies the medial 4/5 of the free superior (anterior) border of the ligament.
- The round ligament of the uterus.
- Ligament of the ovary.
- Ovarian vessels run in the suspensory ligament to reach mesovarium.
- Uterine vessels.
- Lymph vessels & lymph nodes.
- Epoophron
- Paraoophron.

B-Ligaments of the cervix: These are true ligaments formed of condensation of fascia surrounding the cervix



1-Transverse cervical (cardinal or Mackenrod's) ligaments:
Connect the lateral side of cervix & upper part of vagina to the lateral pelvic wall. They are strong fan shaped & very important factor in the support of uterus

2-Pubocervical ligament

Connects the cervix with back of the pubis. They correspond to puboprostatic ligaments in males. ***3-Uterosacral ligament***

Connects the cervix & upper part of vagina to the front of the sacrum (2nd & 3rd pieces).

Factors supporting the uterus in position:

1-The ante-verted ante-flexed position of the uterus makes it to rest on the urinary bladder which has a good support through is connection with the pubic bone just anterior to it.

The angle of ante version prevents prolapse of uterus into the vagina. 2-The ligaments of the cervix which are true ligaments connecting it to the lateral pelvic wall.

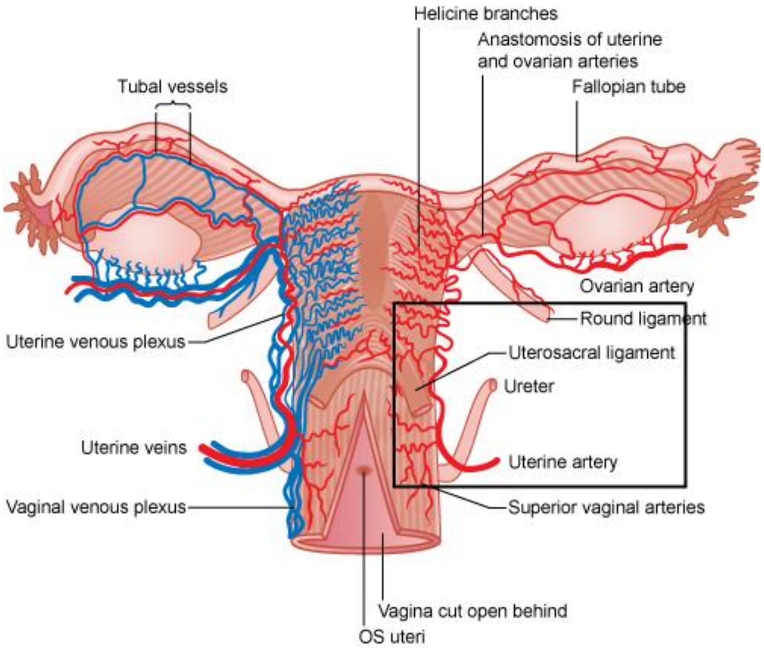
The strongest is the transverse cervical(Mackenrod's) ligament. The round ligament of the uterus has a little role in support by helping to keep the ante-verted ante-flexed position of the uterus

3-The muscles of pelvic diaphragm (levator ani & coccygeus) especially sphincter vaginae part of levator ani.

4-The tone of the surrounding viscera helps to keep the uterus in position.

4-Perineal body.

Blood supply of the uterus:

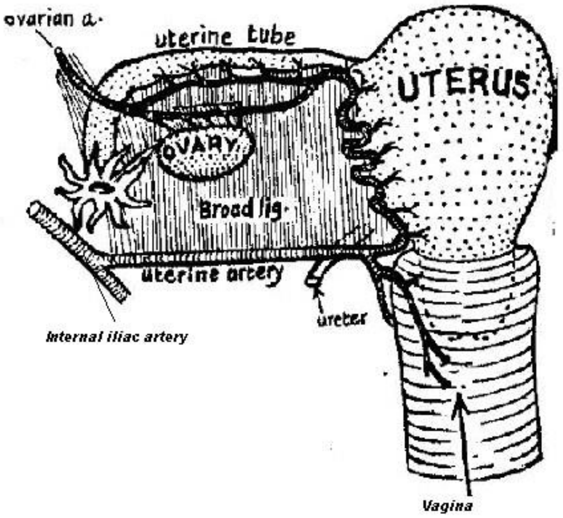


Arteries:

1. *Uterine artery*: It is a branch of the internal iliac artery.

Runs at first medially on the floor of the pelvis in the base of the broad ligament. It passes above the ureter 2 cm lateral to the cervix. It then ascends along the lateral border of the uterus between the two layers of the broad ligament. It is tortuous during this part of its course. Finally, it turns laterally below the uterine tube to end by anastomosing with the ovarian artery. It supplies the uterus. Medial ¾ of the uterine tube. & gives branches to the vagina.

2. *Ovarian artery* gives some branches which supply the uterus.



Veins: The veins of the uterus drain into the uterine veins which drain into the internal iliac vein.

Note:

The close relation of the ureter to the uterine vessels near the cervix has a clinical importance. During hysterectomy, the surgeon should be careful not to injure the ureter during ligature of the uterine vessels.

Nerves of the uterus: are branches of the inferior hypogastric (pelvic) plexuses of veins.

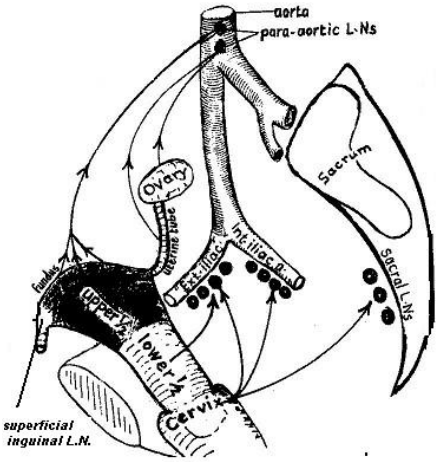
Lymph drainage of the uterus:

1- Fundus, upper part of the body& uterine tube: drain into *para-aortic nodes*.

2-Lower part of the body drain into external iliac lymph nodes.

3-Cornu of the uterus along the round ligament of the uterus drain into the superficial inguinal lymph nodes.

4-Cervix drain into:



a-external iliac lymph nodes. b-Internal iliac lymph nodes. ***c-***Sacral lymph nodes.

The Vagina

It is the female organ of copulation.

It is a tube which extends from the cervix of the uterus to the vestibule (→ the cleft between the 2 labia minora)

Its axis makes a right angle with the uterus.

Its upper part lies in the pelvis & its lower part lies in the perineum. It has an anterior wall (7.5 cm long) & a posterior wall (9 cm long), which are normally in contact with each other.

The upper part of the vagina surrounds the vaginal part of the cervix & is divided into 4 fornices:

-Anterior fornix.

-Posterior fornix (the deepest one).

-2 lateral fornices.

The vaginal orifice has a thin mucosal fold called the hymen, which is perforated, at its center.

Relations of the vagina

Anteriorly

Upper 1/3: is pierced by the cervix.

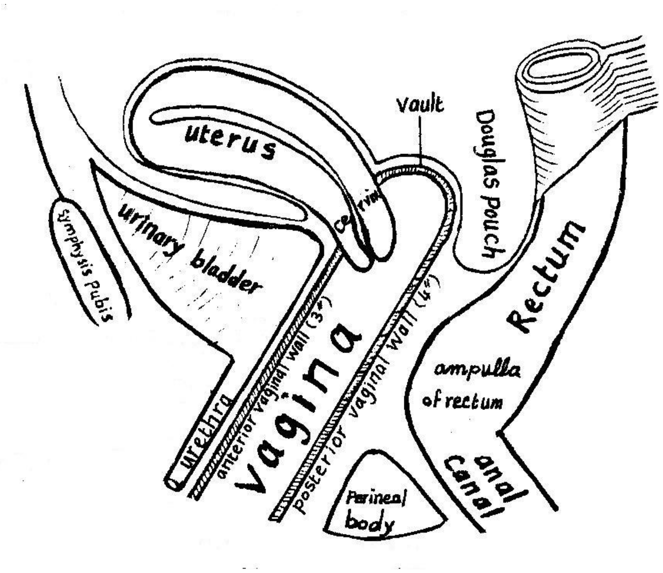
Middle 1/3: Base of urinary bladder

Lower 1/3: Urethra

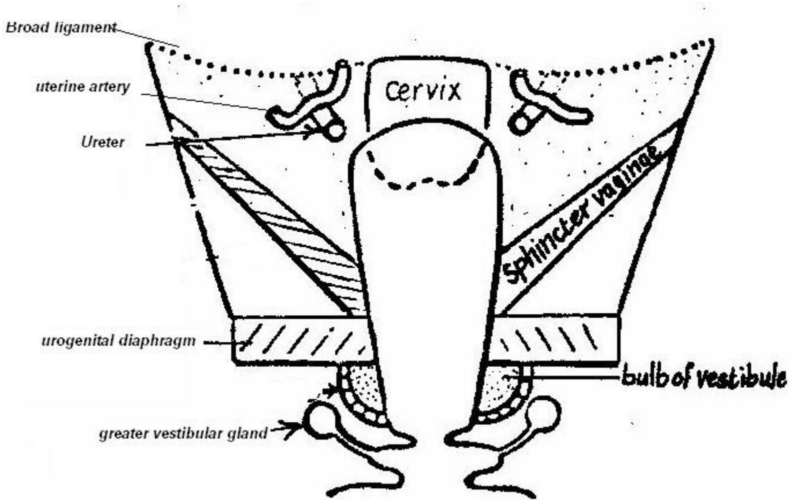
Posteriorly

Upper 1/3 is related to the recto-uterine (Douglas) pouch of peritoneum. It contains coils of small intestine and pelvic colon.

Middle 1/3 is related to the anterior wall of rectum.



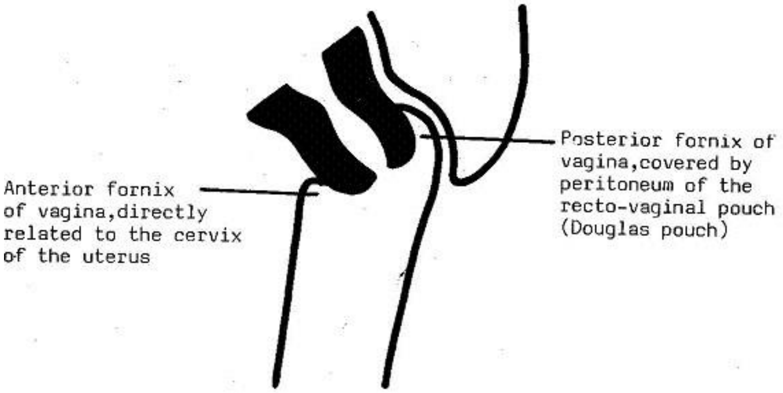
Lower 1/3 is related to the perineal body separating it from the anal canal **Laterally:**



Upper part: related to the base of the broad ligament containing the ureter and uterine artery. **Middle part**: related to levator Ani muscle.

Lower part: related to urogenital diaphragm & bulb of the vestibule.

N.B:


Anterior fornix of vagina,directly related to the cervix of the uterus
Posterior fornix of vagina,covered by peritoneum of the recto-vaginal pouch (Douglas pouch)

The upper part of the posterior vaginal wall (wall of the posterior fornix) is covered with the peritoneum of the recto-uterine (Douglas) pouch. Pus in the peritoneum cavity can be drained by making an opening in the pouch through the posterior vaginal fornix.

The pulsation of the uterine artery can be felt in the living through the lateral vaginal fornix. Stones of the ureter can be also palpated in the same place.

Support of the vagina:

The vagina is exposed to severe pressure during parturition. Many factors help to support it in position:

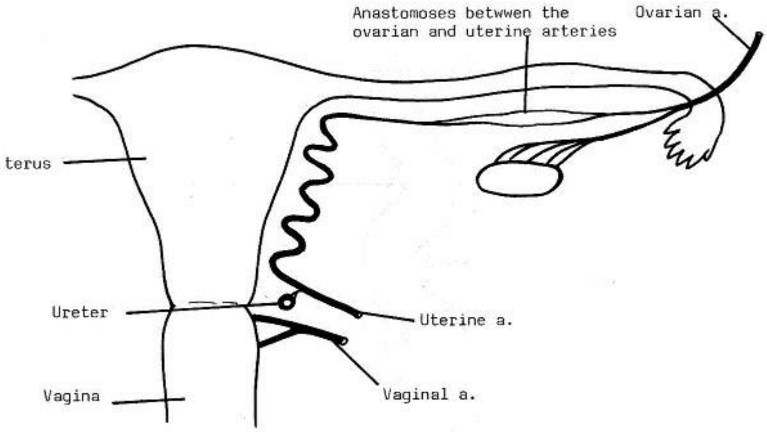
-The upper part of the vagina is supported along with the uterus mainly by the levator ani muscle and cervical ligaments.

The middle part of the vagina is supported by the uro-genital diaphragm (sphincter urethrae muscle).

The lower part of the vagina (in the perineum) is supported by the perineal body especially the posterior wall.

Blood supply of the vagina:

Arteries:



1-Vaginal artery which is a branch of the internal iliac artery.

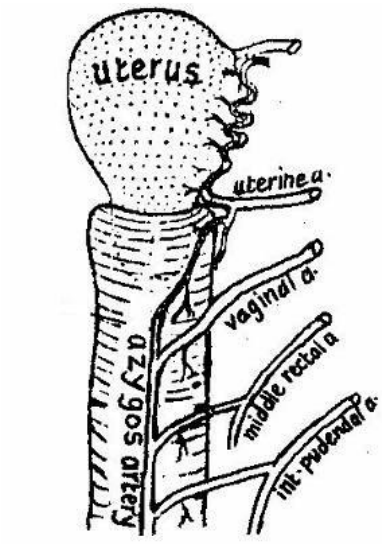
2-Branches of the uterine artery.

3-Branches of middle rectal artery.

4-Branches of internal pudendal artery

Veins:

Ends in the internal iliac vein.



Nerves of the Vagina:

Sympathetic & parasympathetic fibres through the pelvic plexuses of nerves.

Lymph drainage of the vagina:

Above the hymen → external and internal iliac L. N.

Below the hymen → superficial inguinal L. N.

The female external genitalia: It is called the vulva. It consists of the following parts:

1. Mons pubis is the skin area over the pubis. It is rounded due to the presence of subcutaneous fat. It is covered with hair which ends along a horizontal line at the junction of the mons pubis with the abdomen.
2. Labia majora are two rounded folds of skin covered with hair. They extend from the mons pubis to meet in the midline posteriorly.
3. Labia minora are two thin folds of skin lying inner to the labia majora. Anteriorly each labium minora split and enclose the *clitoris* between them. They meet superior to the clitoris forming the *prepuce* of the clitoris. They meet inferior to it forming the *frenulum*. Posteriorly the two labia minora unite forming the *fourchette*.

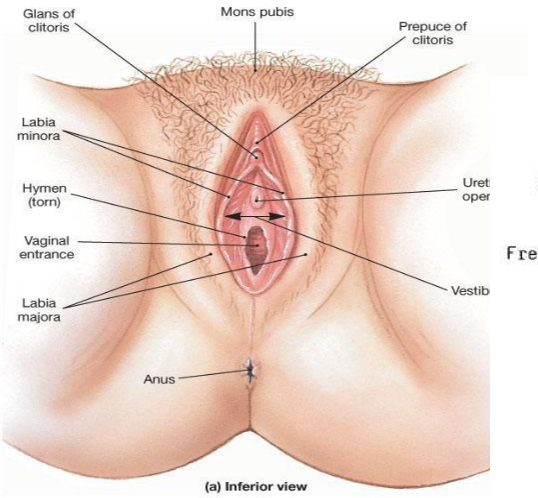
4. The clitoris is similar to penis in structure but differ in being much smaller and not traversed by the urethra. The glans clitoris is partially hidden by the prepuce.
5. The vestibule is the area pounded laterally by the labia minora, anteriorly by the clitoris and posteriorly by the fourchette. It contains the following orifices:
   - The *urethral opening* lies posterior to the clitoris and anterior to the vaginal orifice.
   - The *vaginal orifice* lies posterior to the urethral opening. In the virgin it is partially closed by a thin mucosal fold called the *hymen*.
   - Ducts of the greater vestibular (Bartholin) glands open in the groove between the hymen and posterior part of the labia minora.

The perineum

It is the lower end of the trunk. It is formed of the structures filling the outlet of pelvis below the pelvic diaphragm.

Shape: It has a diamond shaped outline.

Boundaries: Anteriorly: The symphysis pubis.
Posteriorly: The tip of coccyx.
Laterally: Ischial tuberosities.



(a) Inferior view

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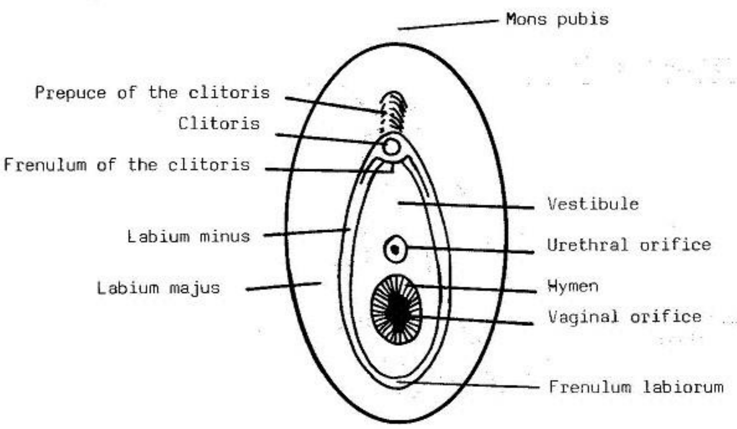


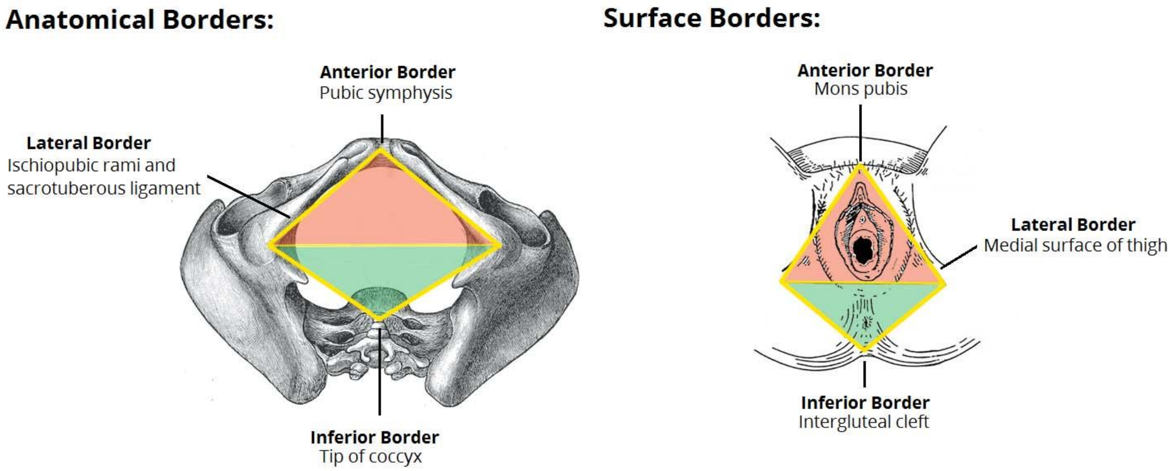
Surface landmarks of the perineum:

- The tip of coccyx can be felt in the natal cleft behind the anus.
- The ischial tuberosity can be felt in the lower part of the buttock. It is the bone upon which we sit as it supports the body weight in the sitting position.

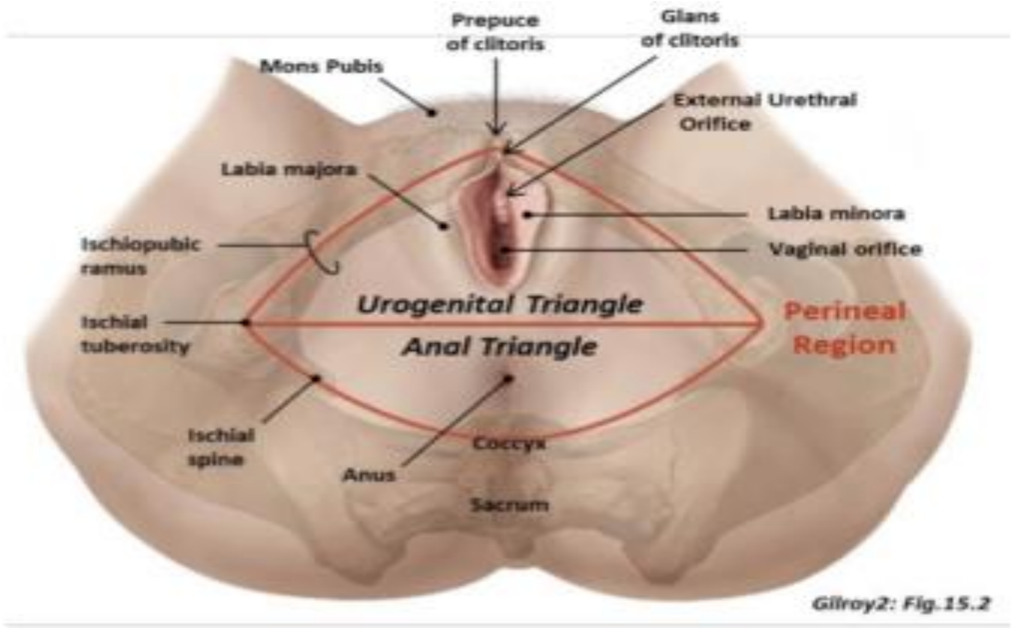
Divisions of the perineum: it is divided by an imaginary line connecting the two ischial tuberosities to

1-Uro-genital triangle: anteriorly

2-Anal triangle: *posteriorly*


Anatomical Borders:

Surface Borders:



Gilroy2: Fig.15.2

The anal triangle

Boundaries:

-Anteriorly: Imaginary transverse line connecting 2 ischial tuberosities.

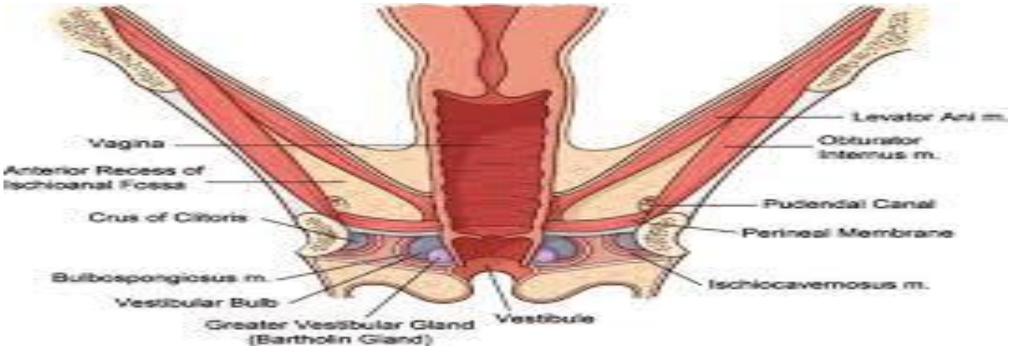
-Posteriorly: tip of coccyx.

- Laterally: a-ischial tuberosity. b-sacrotuberous ligament.

Contents:1- the lower part of the anal canal in the median plane.
2-Two ischio-rectal fossae on each side of the median plane.

The anal canal: is partially located in the pelvis and partially in the perineum. It is described as one unit with the contents of the pelvic cavity along with the pelvic parts of the alimentary tract.

The ischio-rectal (ISCHIO ANAL) fossa



It is a wedge-shaped space present on each side of the anal canal occupying most of the anal triangle of the perineum.

Boundaries:

- ***The base****: is directed downwards* & is formed of skin & fascia of the perineum on each side of the anal orifice.
- ***Lateral* wall(vertical)**: is formed by the obturator internus muscle & fascia.
- ***Medial wall (sloping):*** is formed by: levator ani muscle in the upper 2/3 External anal sphincter in the lower 1/3.
- ***Apex:*** *is directed upwards* & is formed by meeting of the lateral and medial walls.

- ***Anterior wall***: is formed by: the posterior border of the superficial and deep perineal muscles.
- ***Posterior border***: is formed by the gluteus Maximus muscle overlapping the sacro-tuberous ligament.

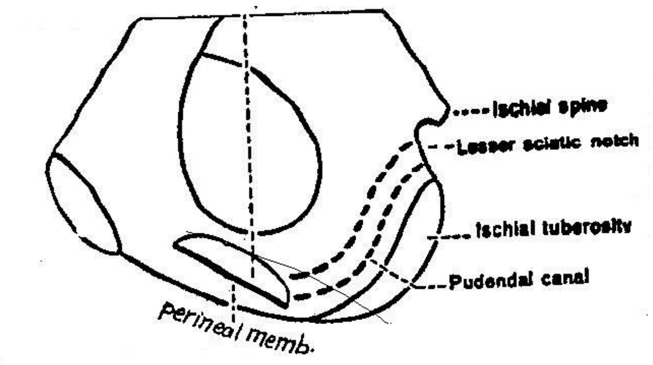
Note: The name ‘ischio-rectal’ is not a very good name as the fossa is related to the anal canal and not the rectum.

Contents of the Ischio-rectal fossa:

1. Semiliquid fat surrounding the anal canal allowing the distention of the anal canal during defecation.
2. Inferior rectal nerve: arises from the pudendal nerve in the pudendal canal. It traverses the fossa from lateral to medial where it enters the external anal sphincter to supply it.
3. Inferior rectal vessels: arises from the internal pudendal vessels in the pudendal canal, accompany Inferior rectal nerve across the fossa to reach the anal canal & the skin around the anus.
4. Posterior scrotal (labial) nerve & vessels: arises in the pudendal canal & pass forwards in the anterior part of the fossa to reach the superficial perineal pouch.
5. Perineal br.of S4 : pierces the coccygeus muscle to enter the posterior part of the fossa .It supplies the external anal sphincter& the skin around the anus.
6. The pudendal canal & its contents.

Pudendal canal

The pudendal canal is a fascial canal located in the lateral wall of the ischio-rectal fossa. It is formed by the splitting of the obturator fascia to enclose the internal pudendal vessels and pudendal nerve.



Contents of the pudendal canal:

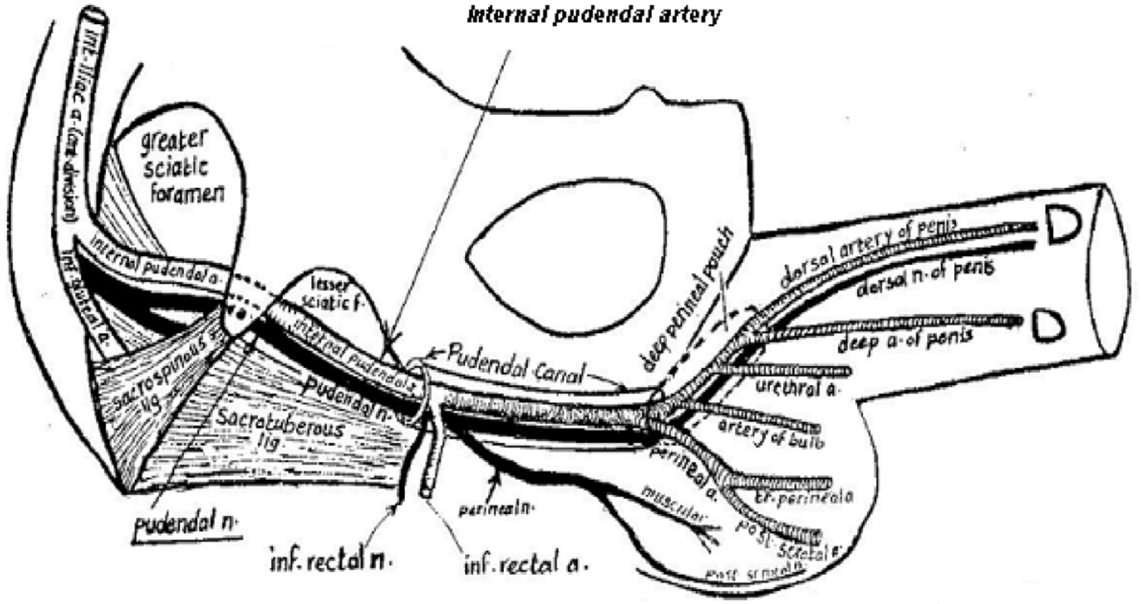
1) Internal pudendal vessels:

The internal pudendal artery is a branch of the anterior division of the internal iliac artery. It enters the perineum by passing through the lesser sciatic foramen from the gluteal region. It passes through the pudendal canal and leaves it to enter the deep perineal pouch.

Branches:

- Inferior rectal artery which supply the lower part of the rectum and anal canal.
- Scrotal arteries (in female they are the labial arteries).

- Artery of the bulb.



- Deep artery of the penis (or clitoris in female).
- Dorsal artery of the penis (or clitoris in female).

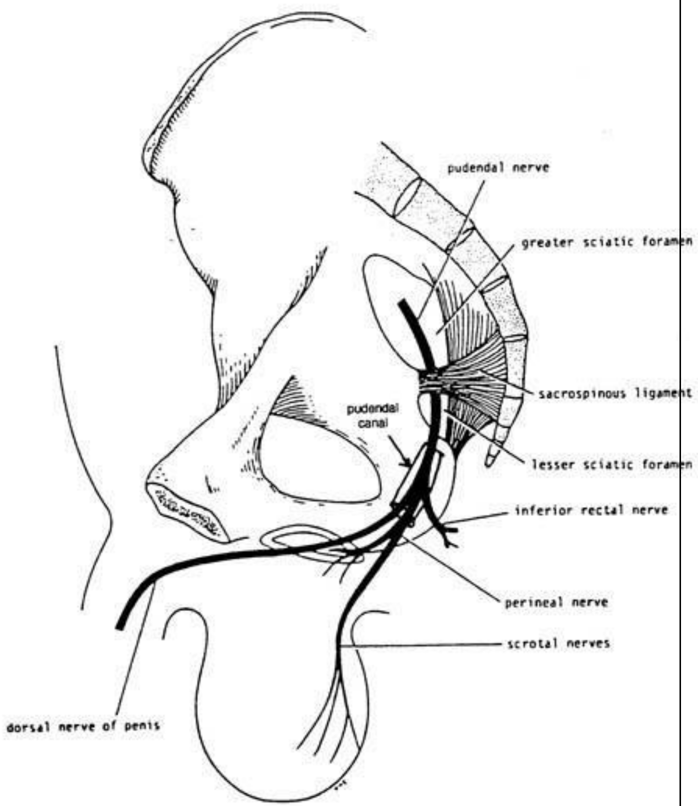
2) Pudendal nerve:

It is a branch of the sacral plexus. It enters the perineum along with the internal pudendal vessels through the lesser sciatic foramen.

It passes in the pudendal canal and give the following branches:

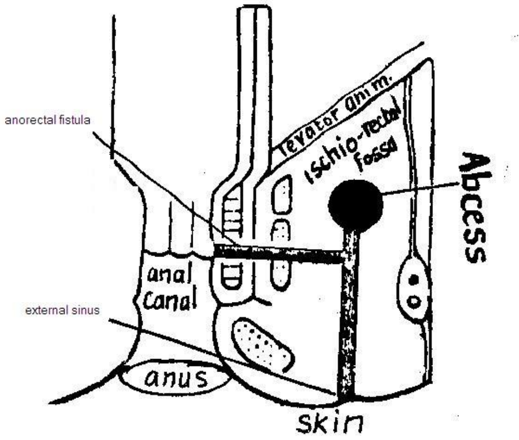
- *Inferior rectal nerve* which supply the lower half of the anal canal and the external anal sphincter.

- The *perineal nerve* which passes with the internal pudendal artery to the anterior end of the pudendal canal. It gives *posterior scrotal* (or *labial*) branches. The *terminal branches* of the perineal nerve pass to the perineal pouches to supply the muscles and the bulb of penis (or the vestibule).



- The *dorsal nerve of the penis* (or *clitoris*) passes through the pudendal canal and deep perineal pouch close to the pubic arch. It pierces the perineal membrane to reach the superficial pouch and passes with the dorsal artery of the penis (or clitoris). It supplies the skin and glans of penis.

Applied anatomy:



Ischiorectal abscess may result from spread of infection to ischiorectal fossa.

If the ischiorectal abscess bursts internally into the anal canal or rectum it produces ***anorectal fistula***

If the ischiorectal abscess bursts externally to the skin it produces an ***external sinus.***

The Urogenital Triangle

Boundaries:

- Anteriorly:

Inferior pubic ligament on lower border of symphysis pubis.

- Laterally:

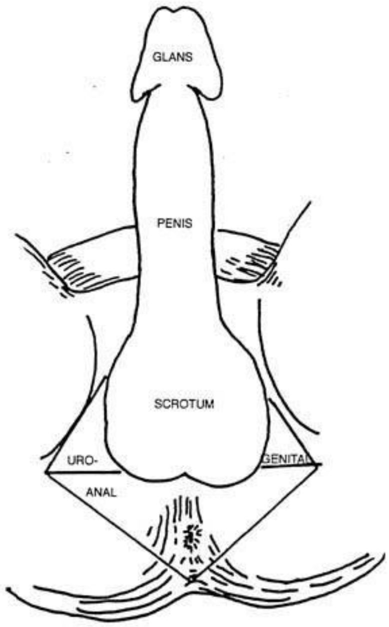
Ischio- pubic rami.

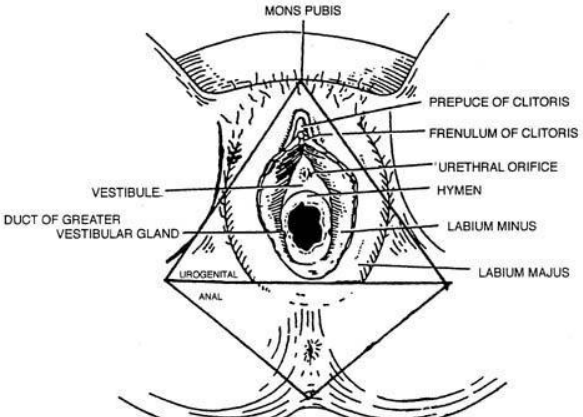
- Posteriorly:

A line connecting the 2 ischial tuberosities

- Inferiorly:

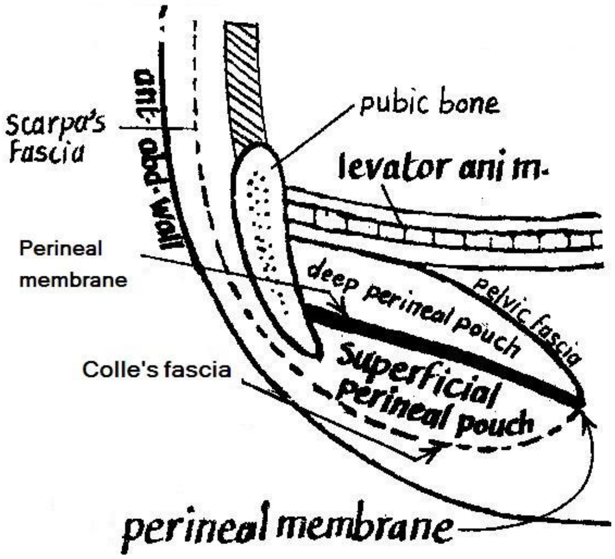
The triangle is covered by skin, which is continuous with the skin of the abdominal wall & the thigh.

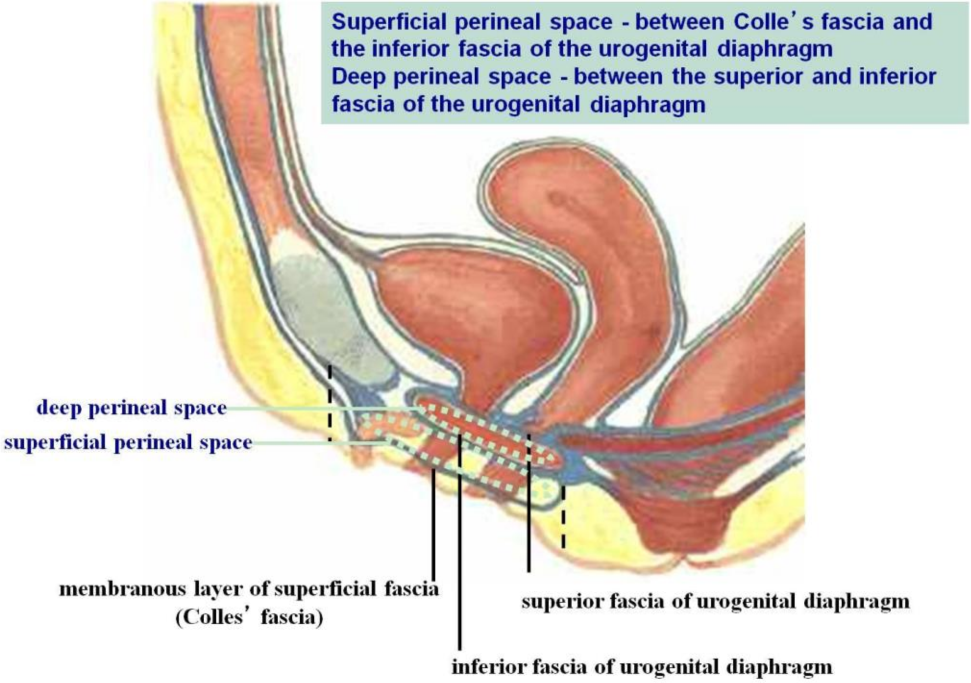




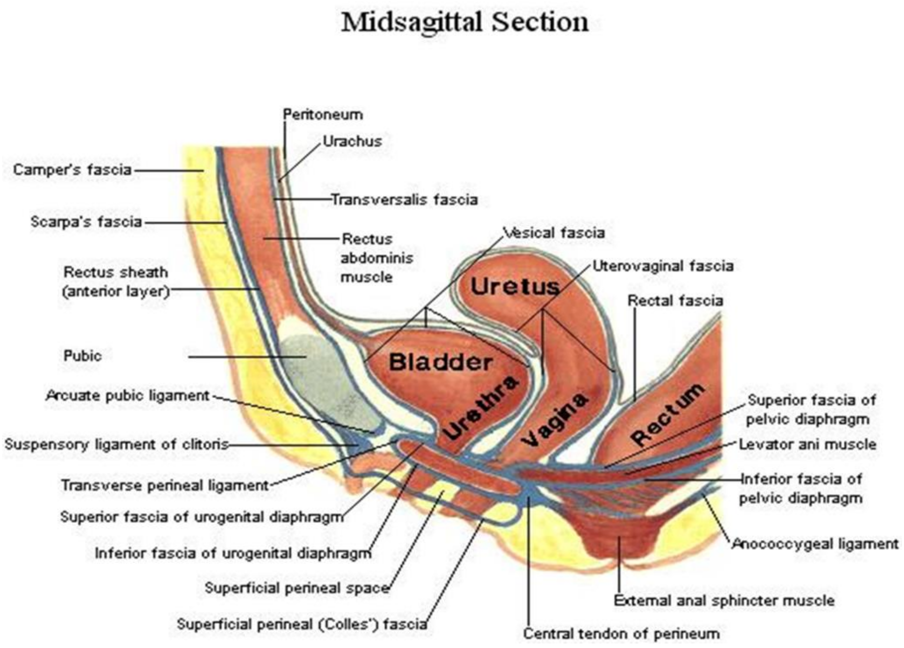
- Three layers of fascia are connected to the boundaries of the triangle except anteriorly.
- This results in the presence of 2 spaces (POUCHES) between the 3 layers of fascia.
- The 3 fascial layers are:
- Inferiorly: The deep membranous layer of superficial fascia (Colle's fascia).
- In the middle: The perineal membrane (inferior fascia of urogenital diaphragm).

- Superiorly: Pelvic fascia (superior fascia of urogenital diaphragm).
- All the three layers fuse posteriorly at the line connecting the 2 ischial tuberosities.
- The 2 pouches enclosed between the 3 membranes are:
- Superficial perineal pouch: enclosed between the membranous layer of superficial fascia & perineal membrane.
- Deep perineal pouch: enclosed between the perineal membrane & the pelvic fascia.




Superficial perineal space - between Colle's fascia and the inferior fascia of the urogenital diaphragm
Deep perineal space - between the superior and inferior fascia of the urogenital diaphragm

deep perineal space
superficial perineal space
membranous layer of superficial fascia (Colles' fascia)
superior fascia of urogenital diaphragm
inferior fascia of urogenital diaphragm


Midsagittal Section
Peritoneum
Urachus
Camper's fascia
Transversalis fascia
Scarpa's fascia
Rectus abdominis muscle
Vesical fascia
Rectus sheath (anterior layer)
Uterovaginal fascia
Uretus
Rectal fascia
Pubic
Bladder
Arcuate pubic ligament
Urethra
Vagina
Rectum
Superior fascia of pelvic diaphragm
Suspensory ligament of clitoris
Levator ani muscle
Transverse perineal ligament
Inferior fascia of pelvic diaphragm
Superior fascia of urogenital diaphragm
Anococcygeal ligament
Inferior fascia of urogenital diaphragm
Superficial perineal space
External anal sphincter muscle
Superficial perineal (Colles') fascia
Central tendon of perineum

The Urogenital Diaphragm

- It is a musculo-facial diaphragm formed of sphincter urethrae & deep transverse perineal muscles.
- It is covered:
- Inferiorly by the perineal membrane (inferior fascia of urogenital diaphragm).
- Superiorly by the pelvic fascia (superior fascia of urogenital diaphragm).

The scrotum:

This is a sac of skin containing the testis and epididymis. The skin of the scrotum is covered by some hair.

THE SUPERFICIAL PERINEAL POUCH

Definition: It is a fascial space in the urogenital triangle lying between the perineal membrane & the membranous layer of superficial fascia of the perineum.

Boundaries:

- Floor: membranous layer of superficial fascia (Colle’s fascia) Roof: Perineal membrane.
- Laterally: Pouch is closed by fusion of the 2 layers with the pubic arch.
- Posteriorly: Pouch is closed by fusion of the roof & floor.
- Anteriorly: the pouch is opened as the membranous layer of superficial fascia of the perineum (Colle’s fascia) is continuous with that of the abdomen (Scarpa’s fascia).
- The pouch is thus continuous with the potential space between the membranous layer of superficial fascia of the abdominal wall & the external oblique aponeurosis.

Contents i*n the male*

A- The root of the penis: 3 masses of erectile tissue:

1-Bulb of the penis: It is the posterior expanded part of the corpus spongiosum It lies in the median plane& is traversed by the urethra.
It is covered by bulbo spongiosum muscle.

2- Two crura of the penis:

Each represents the posterior part of corpus cavernosum. Each is firmly attached to the pubic arch. It is covered by
Ischiocavernousus muscle. It is pierced by deep artery of penis

B-3 pairs superficial perineal muscle:

1-Superficial transverse perineal muscle (Rt.& Lt):

They lie in posterior part of superficial perineal pouch.

Origin: ischial ramus. Insertion: perineal body.

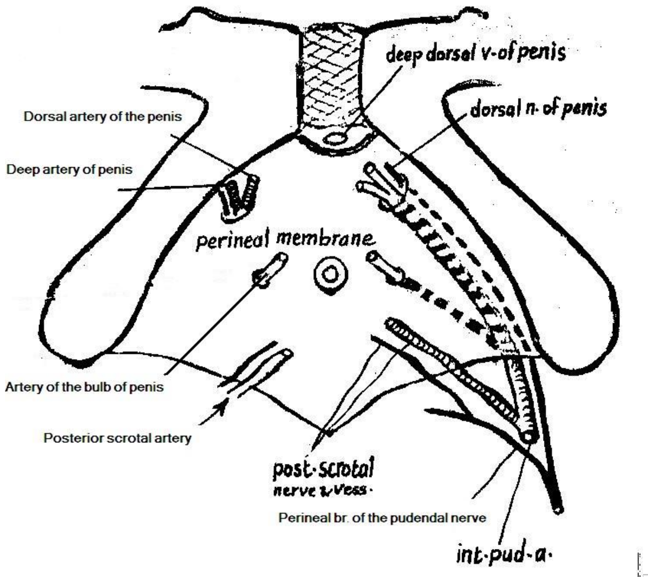
Action: fix perineal body in center of perineum

2-Ischiocavernosus muscle (Rt.& Lt): arises from ischial ramus & inserted in the crus of penis.cover the 2 crura of penis.They support the erect penis.

3-Bulbospongiosus muscle (Rt.& Lt): arises from the perineal body & median raphe on the bulb of the penis .Its fibers encircle the penis & are Inserted into its wall.as well as into corpus cavernosum & dorsum of the penis.

Action: It compresses the bulb & corpus spongiosum to evacuate the last drops of urine & semen from the urethra. Its anterior fibers help in erection by compressing the deep (dorsal) vein of the penis.

- N.B : All superficial perineal muscles are supplied by perineal branch of pudendal nerve


deep dorsal v-of penis
dorsal n. of penis
Dorsal artery of the penis
Deep artery of penis
perineal membrane
Artery of the bulb of penis
Posterior scrotal artery
post-scrotal nerve & vess.
Perineal br. of the pudendal nerve
int-pud-a.

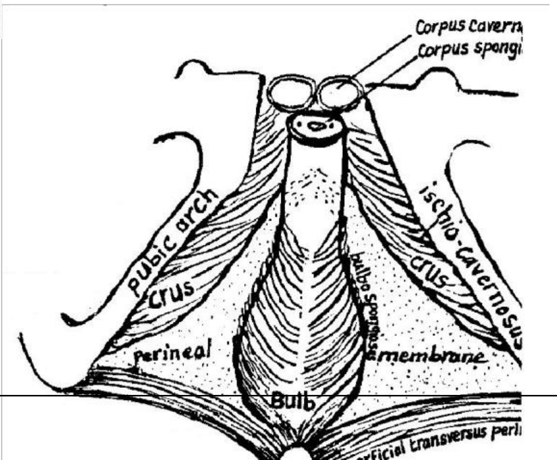
-Vessels. & Nerves:

Arteries:

- a.Posterior scrotal artery.
- b.Dorsal artery of penis.
- C.Deep artery of penis.
- d.Artery of the bulb of the penis.

Nerves:

- a. Dorsal n. of penis.
- b.Scrotal nerves
- 3-Veins: the deep dorsal vein of penis.



Contents in the female:

A- The root of the clitoris:

1-Bulb of the vestibule: It is elongated mass of erectile tissue on each side of the lower part of the vagina.

Superiorly: it is attached to the perineal membrane.

Inferiorly: It is covered by bulbospongiosus muscle.

2-Crura of the clitoris: Similar to the crura of the penis.

3- Greater vestibular (Bartholin) gland: It lies on the inferior surface of the perineal membrane under cover of the posterior part of the vestibule. Its duct opens into the lower part of the vagina.

B-3 pairs Superficial perineal muscle:

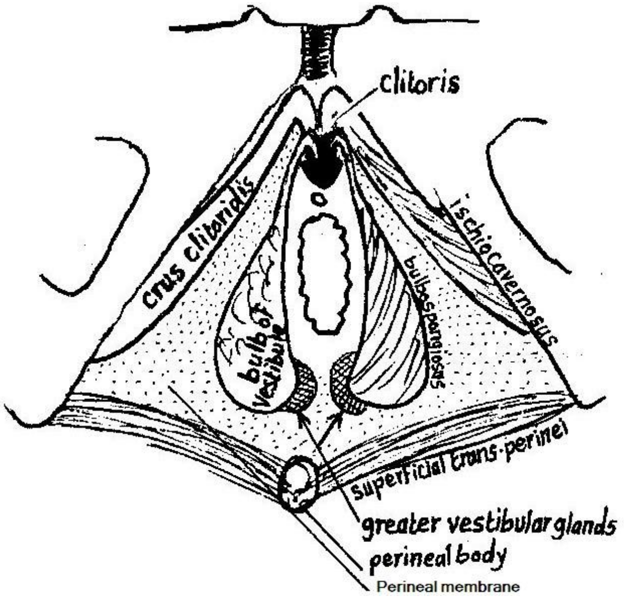
1-Superficial transverse perineal muscle: as in males.

2-ischiocavernosus muscle. as in males.

3-Separate bulbospongiosus muscle: Each arises from the perineal body, passes forwards covering the bulb & the greater vestibular gland to be inserted into the clitoris. Action: Sphincters of the vagina.

- N.B: All superficial perineal muscles are supplied by perineal branch of pudendal nerve

C-Vessels. & Nerves: as in males.



THE DEEP PERINEAL POUCH

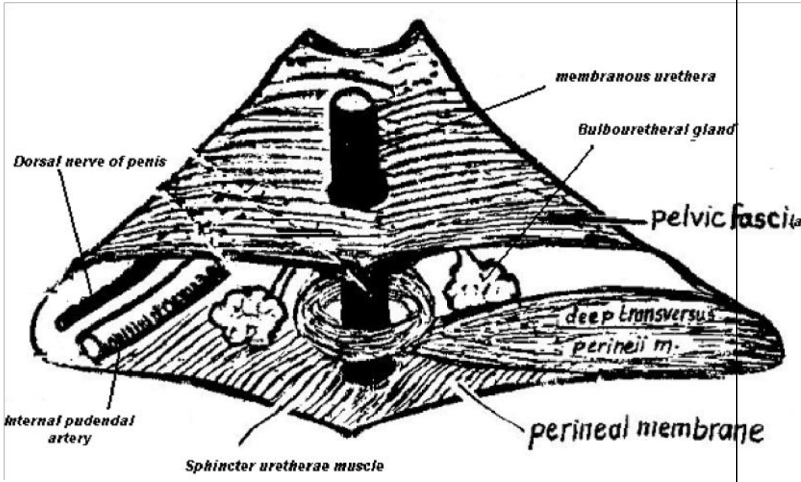
Boundaries

Floor: perineal membrane (inferior fascia of urogenital diaphragm).

Roof: Superior fascia of urogenital diaphragm.

Laterally: Roof & floor are attached to then pubic arches.

Anteriorly& posteriorly: Pouch is closed by fusion of roof & floor.



Contents

In the male:

1-Membranous urethra.

2- Bulbourethral glands.

3- Sphincter urethrae.

4- Deep transverse perineal muscle

(Both form the urogenital diaphragm):

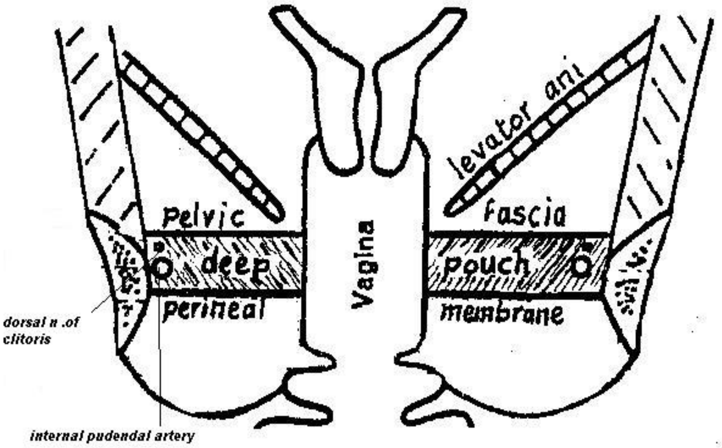
In the posterior part of the pouch).

5- Dorsal n. of penis: one of the 2 terminal branches of pudendal nerve.

6-Termination of internal pudendal artery:

runs with the dorsal nerve of penis

close to the pubic arch.



In the female:

1- Lower end of urethra.

2- Lower end of vagina.

3- Deep transverse perineal muscles: as in males.

4- Sphincter urethrae muscle.

5- Dorsal n. of clitoris

6-Termination of internal pudendal a.

- **Sphincter Urethrae:**2 groups of fibers:

  1-Inner circular fibers: around the urethra.

  2-Outer transverse fibers arise from the inferior pubic ramus. Some fibers pass in front of the urethra, & other fibers pass behind the urethra to be inserted into a median raphe in front & behind the urethra's

  Function: To control micturition voluntarily. ○

Deep Transverse Perinei:

Origin: Ischial ramus.

Insertion: into the perineal membrane.

Site: It lies posterior to sphincter urethrae.

- **Bulbourethral Glands**:

  Lie in deep perineal pouch

  Located within fibers of sphincter urethrae.

  Their ducts pierce perineal membrane to open into the penile urethra.

- **Greater Vestibular Glands (Bartholin glands)**

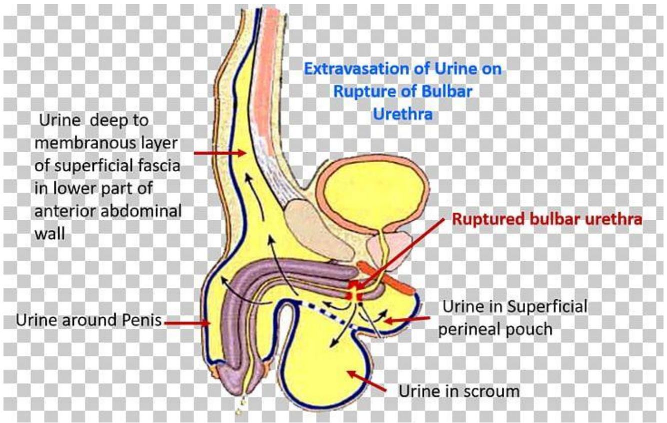
  Lie in superficial perineal pouch

  Open directly into vestibule of vagina.

Applied anatomy

Rupture of membranous urethra leads to accumulation of urine in the deep perineal pouch, which is closed all around.

Rupture of penile urethra leads to escape of urine into superficial perineal pouch. Urine escapes into the scrotum & penis then ascends into the interval between the membranous layer of superficial fascia of anterior abdominal wall & external oblique aponeurosis.


Extravasation of Urine on Rupture of Bulbar Urethra
Urine deep to membranous layer of superficial fascia in lower part of anterior abdominal wall
Ruptured bulbar urethra
Urine around Penis
Urine in Superficial perineal pouch
Urine in scroum

Urine does not descend into the thigh due to fusion of scarpa's fascia of anterior abdominal wall to fascia lata of the thigh below the inguinal ligament.

Perineal membrane:

It is a strong triangular fibrous membrane which fills the space between pubic arch.

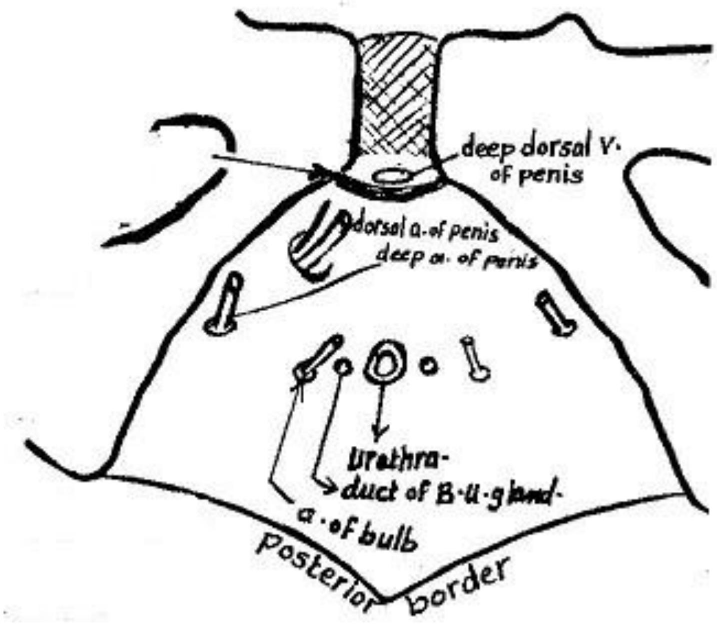
Attachments;

Apex (anterior border):

Is directed forward towards the symphysis pubis where it is thickened to form the transverse perineal ligament which is separated from the arcuate pubic ligament by a small gap which transmits the deep dorsal vein of the penis.

Base (post.border) : Stretches between the 2 ischial tuberosities where it fuses with both the pelvic fascia & colle's fascia.

On each side:It is attached to the pubic arch.



Structures piercing the perineal membrane:

In male:

1-Urethera: pierces the membrane 1 inch behind & below the symphysis pubis.

2-Ducts of bulbo- ureteral glands : one on each side of the urethra.

3-Artery of the bulb (one on each side) : close to the ureteral opening.

4-Deep artery of penis: close to the pubic arch, halfway the apex & the base.

5-Dorsal artery of penis: close to the pubic arch , near the apex.

6- Dorsal nerve of penis: close to the pubic arch , near the apex.

In female:

1-Urethera: pierces the membrane 1 inch behind & below The symphysis pubis.

2-Vagina: pierces the membrane in the middle line just behind the urethra.

3-Artery of the bulb.

4-Deep artery of clitoris

5-Dorsal artery of clitoris.

6- Dorsal nerve of clitoris.

The perineal body is a fibrous tissue mass situated in the centre of the posterior margin of the uro-genital diaphragm.

In males: it lies between the bulb of penis & the anal canal.

In the female: it lies between the lower 1/3 of vagina & the anal canal.

It acts as a point of attachment of the following muscles:

1-anterior fibers of levator ani (pubococcygeus part) of both sides.

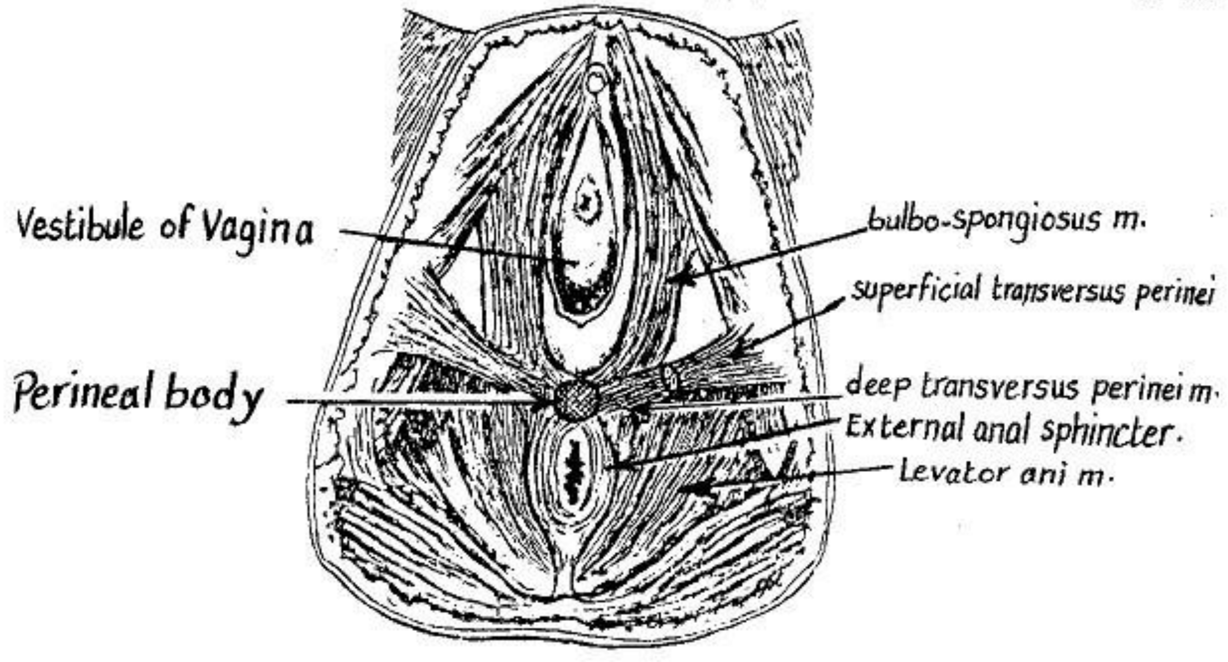
2- fibers of sphincters uretherae muscle.

3-deep transverse perineal muscles.

4-Superficial transverse perineal muscles.

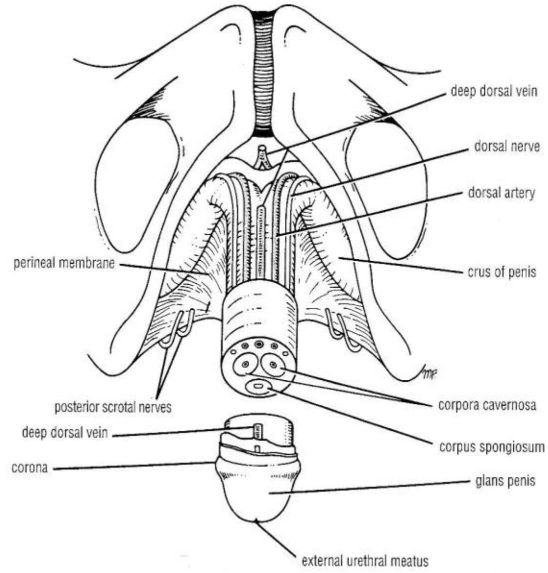
5-Bulbo-spongiosus.

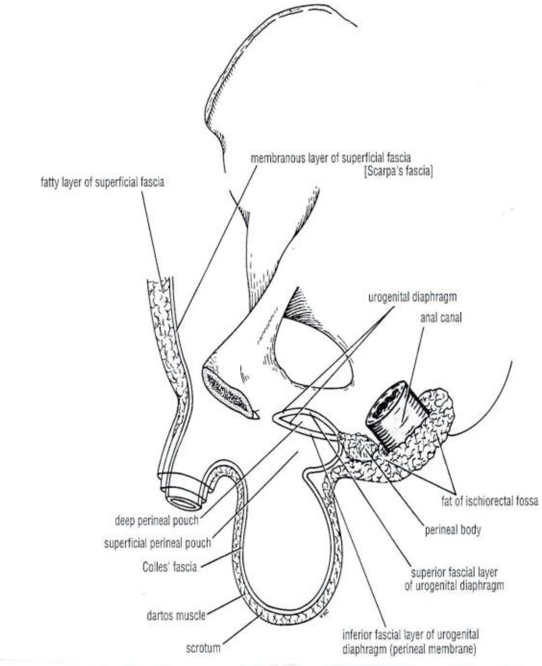
6-External anal sphincter



Applied anatomy:

Rupture of the perineal body during delivery leading to widening of the gap between the anterior free borders of levator ani m of both sides thus predisposing to the prolapse of the uterus, rectum or the urinary bladder.


deep dorsal vein
dorsal nerve
dorsal artery
perineal membrane
crus of penis
posterior scrotal nerves
corpora cavernosa
deep dorsal vein
corpus spongiosum
corona
glans penis
external urethral meatus


membranous layer of superficial fascia [Scarpa's fascia]
fatty layer of superficial fascia
urogenital diaphragm
anal canal
fat of ischiorectal fossa
deep perineal pouch
perineal body
superficial perineal pouch
Colles' fascia
superior fascial layer of urogenital diaphragm
dartos muscle
inferior fascial layer of urogenital diaphragm (perineal membrane)
scrotum